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Managing Small and Alternative Wastewater Systems: A Planning Manual

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Each and every community has a unique political makeup and equally unique wastewater problems. Thus, successful SAWS management programs are specifically designed to meet the needs and constraints of their locations. This manual will help SAWS planners identify a number of management options for their community and then help them evaluate those options.

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MANAGING
SMALL AND ALTERNATIVE
WASTEWATER SYSTEMS

A PLANNING MANUAL

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INTRODUCTION

This workshop examines some of the unique problems and opportunities associated with the management of Small Alternative Wastewater Systems (SAWS). For many rural and suburban communities traditional gravity sewers and publicly-owned treatment works (POTWs) are not economically feasible. And even if they were, they might not be the preferred wastewater management alternative. Smaller scale decentralized wastewater technologies can often match or even surpass large centralized systems in attaining water quality and public health objectives.

Like large centralized systems, small decentralized systems consist of plants and equipment which process the wastewater to an acceptable quality for discharge to the environment. These plants and equipment must be designed, installed, operated, maintained, and eventually replaced. It is also essential that their performance be monitored to insure proper operation. Proper MANAGEMENT is just as important to the successful operation of small decentralized facilities as it is to large centralized facilities.

The thought of managing the numerous small decentralized facilities which often make up a SAWS may make wastewater planners uneasy. However, other utility planners have dealt with similar issues for years. For example, telephone companies have established minimum standards for equipment which is hooked into their systems. Gas companies have emergency repsonse and immediate repair services. (Not having a functioning toilet may be inconvenient but a gas leak can kill you!) The contract services provided by fuel oil distributors provide an excellent example of homeowners accepting reponsibility and paying for the maintenance of complex mechanical equipment.

Although the management of SAWS is a new problem for many wastewater planners, it is not an insurmountable one. This workshop provides both the planning tools and background information needed to develop and evaluate alternative management strategies for a given SAWS.

Since the terms SAWS and management will be used throughout the workshop, let's begin by establishing common definitions.

SAWS - Small Alternative Wastewater Systems include not only individual on-site systems such as septic tanks, but also innovative and alternative collection and small scale centralized treatment technologies which are frequently cost effective in rural and suburban areas. Grinder and STEP pressure sewers, small diameter gravity sewers, vacuum sewers, community septic tanks and large soil absorption fields are typical examples of SAWS.[1]

Management - SAWS management includes any actions taken to insure the proper performance of wastewater processing equipment. The range of management functions is quite large including education, planning, design, installation inspection, operations, maintenance, replacement, monitoring and enforcement. Management functions may be performed by a variety of individuals or groups including private property owners, home owner associations, private contractors, engineering firms or state or local agencies. This workshop focuses on the role of public agencies in the management of SAWS.

The proposed SAWS management options are often critical to the selection of alternative SAWS technologies. For each technical alternative, there may be a number of feasible management options. When a management option has been paired with each technical alternative, a comprehensive comparison can be made and the most cost-effective course of action selected. While it is interesting to consider the relative merits of various innovative technologies, the discussions at this workshop will be limited to the selection of an appropriate management program for a given technical solution.

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[1] A Strategy for Small Alternative Wastewater Systems," EPA Office of Water Program Operations, December 1980.

Innovative and Alternative Technology Assessment Manual, EPA Office of Water Program Operations, Municipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio, February 1980, EPA 430/9-78-009.

Design Manual - Onsite Wastewater Treatment and Disposal Systems, EPA Office of Water Program Operations, Muncipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio, October 1980, EPA 625/1-80-012.

Process Design Manual - Wastewater Treatment Facilities for Sewered Small Communities, EPA Office of Water Program Operations, Municipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio, October 1977, EPA 625/1-77-009.

As mentioned above, both a planning methodology and background on SAWS management will be presented at this workshop. In addition, you will get to test your grasp of the material presented through participation in a problem solving session. The program for the workshop, which is also reflected in the organization of this workbook, includes three sections: introductory material, special issues and case studies.

INTRODUCTORY MATERIAL

- Components of a SAWS Management Program

  An introduction to the required elements of a SAWS management plan. This presentation is of necessity an overview. For more detailed information on all of the potential institutional options, you should consult the comprehensive guidebook on SAWS management recently prepared for EPA.[1]

- SAWS Management Planning Methodology

  A step-by-step procedure for comprehensive planning of SAWS management programs.

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[1] Interim Study Report Management of On-Site and Small Community Wastewater Systems, EPA Office of Water Program Operations, Municipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio, November 1979, M687.

Roy F. Weston, Inc., Management of On-site and Small Community Wastewater Systems, (Draft Final Report), Prepared for EPA Office of Water Program Operations, Municipal Environmental Research Laboratory, Office of Research and Development, Cincinnati, Ohio, April 1981.

SPECIAL ISSUE PRESENTATIONS

General issues arise in the planning of most SAWS management programs. Five of the key issues are discussed in depth.

- Personal and Property Rights and SAWS Liability

  When damage occurs as the result of the implementation of a SAWS program, who corrects the situation and who pays?

- Participation

  Which existing and future property owners do you want to have participating in SAWS management programs and what leverage do you have to require their participation?

- Costs

  What are the costs of SAWS management and who should pay?

- Finances

  What are the financing options for SAWS management programs?

- Use of Private Firms in SAWS Management

  Why should public agencies consider contracting private firms to perform some or all SAWS management tasks?

CASE STUDIES

The workbook concludes with six case studies of SAWS management programs.

- Acton, MA

  A suburban community with an operating on-site management program and a manifest system to track septage disposal.

- Waynesville, IL

  A small rural community involved in a facilities planning process with several cluster systems and an on-site management program as the selected alternative.

- Rome City, IN

  A recreation community with an existing gravity sewer to serve the downtown and a grinder pump pressure sewer system to serve lakeside residences.

- Pueblo, CO

  A community with a demonstration program on the effects of SAWS management in an area with water quality problems.

- Williston, VT

  A farming town on the edge of a growing urban area that contracts site evaluation, plan review and construction inspection for on-site systems with a private firm.

- Lagoona Park, IN

  An island community installing a STEP system and seting up a management program under an EPA grant.

SUMMARY

This manual outlines a planning methodology for the development of a SAWS management program. It identifies the questions a community must consider when planning SAWS management and also offers some alternative answers to those questions.

Each and every community has a unique political makeup and equally unique wastewater problems. Thus, successful SAWS management programs are specifically designed to meet the needs and constraints of their locations. This manual will help SAWS planners identify a number of management options for their community and then help them evaluate those options.

COMPONENTS OF A SAWS MANAGEMENT PROGRAM

INTRODUCTION

Most communities regulate on-site and small wastewater systems to some degree and, in essence, already have a limited SAWS management program. However, this regulatory program may only address a few of the management needs of wastewater systems. But what are "the management needs" of on-site and other small wastewater systems? This question points to the usefulness of first defining what constitutes a SAWS management program. A SAWS management program should consist of three major components.

- Management Services--These are activities that are designed to insure the proper design, installation, and operation of wastewater systems.
- Implementation Measures--These are incentives, such as regulations, financial assistance, public education, and enforcement that help implement SAWS management functions.
- Institutional Arrangements--These involve the delineation of parties responsible for implementing and managing a SAWS program and the financial mechanisms to fund the management program.

Each of these components is separately discussed below.

MANAGEMENT SERVICES

The implementation of SAWS technology is hampered to some extent by the perception that many of the systems have a limited longevity. Critics often cite failing on-site systems and package treatment plants that don't meet discharge requirements as rationale for building conventional centralized sewer systems. In fact, many of the problems with SAWS are *not* due to technical deficiencies--rather, the problems are a result of inadequate management. Consider, for example, some common reasons why on-site septic/soil absorption systems often fail.

- Improper system siting such as locating absorption systems on unsuitable soils, steep slopes, or in areas of high groundwater

- Poor design such as undersizing of systems
- Poor installation of systems including smearing the sidewalls and bottoms of trenches during construction, using unwashed gravel, or using improper slopes for distribution pipes
- Hydraulic overloading by improper homeowner water use habits
- Introduction of large amounts of nonbiodegradable solids into the system including cigarettes, grease, and other nondegradable materials
- Failure to periodically pump out the solids from the septic tank resulting in solids overflows and clogging of the absorbtion system
- Improper site activities such as poor drainage patterns near the absorption system, allowing large vehicles to drive over the absorption field, planting heavily rooted trees near the absorption field

As seen from this list, the causes of problems and failures in on-site systems may occur throughout the lifecycle of SAWS technologies. Improper design of on-site systems, for example, can lead to premature and continuous failure of a system. Failure to pump out a septic tank and conduct other routine maintenance may also lead to periodic problems and eventual premature failure of a system.

An on-site system may function perfectly well from the homeowner's viewpoint, but still cause water quality problems. Location of absorption fields over highly permeable soils, for example, may lead to poor adsorption of wastewater contaminants to soil particles, causing groundwater contamination. Locating too many systems around a lake or too close to a lake may speed the eutrophication process of the lake.

The implication of these SAWS performance issues is clear: SAWS management requires a lifecycle approach--from location and design of systems to system use and monitoring.

Proper management of SAWS technologies should include at a minimum the management services listed below.

- Planning--There are two major planning considerations with respect to SAWS technology: determining cost-effective community-wide wastewater management solutions; and integrating wastewater management with land use decisions. The first consideration essentially involves facility planning analysis. It involves determining existing and future facility needs and selecting the most appropriate wastewater technologies to meet those needs.

  Land use decisions should be integrated with wastewater planning. Poor performance for some SAWS technologies is sometimes attributable to inappropriate land use decisions. Poor land use planning includes: density problems (such as allowing too many on-site systeems in a lake watershed); locational problems (such as allowing on-site systems to be built in areas where soils are unsuitable); and timing problems, for example, allowing growth to occur too rapidly resulting in public wastewater facilities becoming overloaded.

- Site Evaluation--This activity encompasses the site specific assessment of system/site suitability. It considers such factors as soils, ground and surface water, geology, topography, and climate. Soils, for example, are particularly important for standard septic tank/soil absorption systems and for land application systems.

- Design Review--This service ensures that the proposed wastewater system, the site, and the wastewater characteristics are all considered together so that the system will adequately treat the wastewater to minimize public health and water quality impacts. It involves the review of plans and specifications and evaluating them against technical criteria or performance standards.

- Installation and Construction Supervision--The purpose of this service is to ensure that systems are constructed according to plans, procedures, and constraints considered in the previous management services. This service involves one or more site inspections during various phases of the construction of less complex systems, such as septic tank/absorption field systems. For more complex technologies involving, for example, centralized systems and collection systems, a construction management program will be required to supervise construction on a daily basis.

- Monitoring--The purpose of this service is to detect problems in system performance and to detect system failures. Activities include both inspection of the systems and groundwater and surface water quality monitoring.

- Routine Maintenance Assurance--Well designed and installed systems may soon perform poorly, and ultimately fail, without a continuing operation and maintenance program. In order to achieve optimum system performance, a mechanism needs to be developed to ensure routine maintenance requirements.

- Problem Correction--If malfunctions occur in the operation of SAWS technology, adequate authority is necessary to ensure that problems are corrected or systems rehabilitated.

The above list represents a "suggested minimum services" for a SAWS management program. The listed services are required to manage either privately or publicly-owned SAWS technologies. Current EPA guidance on construction grants funding distinguishes among "required" and "suggested" SAWS management functions. Required functions for on-site systems where EPA funding is involved include, according to EPA guidance,[1] the following: monitoring (system inspection and water quality measurements); routine maintenance (septage pumpouts as required); and financing. EPA's rationale for only requiring these functions is that EPA will only fund the repair or replacement of on-site systems built and occupied before December 27, 1977 through the Construction Grants program. Thus, "pre-operation" management functions are excluded from EPA's "required" list.

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[1] Management of On-Site Wastewater Treatment Systems: Guidance for Facility Planning" (Draft), Office of Water Program Operations, Facility Requirements Division, EPA, March 18, 1981.

IMPLEMENTATION MEASURES

In wastewater management, common implementation measures include: pre-treatment ordinances, sewer surcharges; wastewater treatment operation and maintenance training manuals; and NPDES permits. As seen from this list, implementation measures may be regulatory, enforcement, economic, or educational in nature. One of the principal tasks in developing a SAWS management program is selecting implementation measures for the SAWS management services.

There are several types of implementation measures potentially applicable to SAWS management. Exhibit 1 presents a generic list of applicable measures and discusses potential SAWS management uses and concerns.

Several points to note from this Exhibit are listed below.

- Sanitary or health codes are the basic regulatory devices in SAWS management. From there, a number of other regulatory mechanisms may be set in motion, including plans, permits, recordkeeping, and licensing/certification/registration.

- Regulatory controls include: direct controls over the SAWS technology; controls on the actors (designers, installers, etc.) involved in SAWS management; and indirect controls, such as land use measures, that affect the need for and use of certain SAWS technologies.

- Enforcement mechanisms supplement regulatory controls--regulations must first exist to be enforced.

- Economic and technical assistance may be used to complement or substitute for regulatory/enforcement techniques. In essence, they may be used as alternatives to regulation for certain SAWS functions.

EXHIBIT 1
SAWS MANAGEMENT IMPLEMENTATION MEASURES

MEASURE	DEFINITION	SAWS MANAGEMENT EXAMPLES	COMMENTS
o ORDINANCE OR CODE	This is a legally enforceable measure that may set design standards, construction specifications, or performance standards; outline permit application procedures, site evaluation procedures, plan review processes and other administrative procedures, or establish fees and user charges.	o Sanitary or health code o Subdivision ordinance	This is the most basic of implementation measures. Local or substate ordinances and codes may require state enabling legislation to be in conformance with existing state legislation. It is absolutely imperative that variance procedures are also set forth.
o PLAN	This is a document which sets forth in writing and graphic form the details of a proposed action.	o Site plan o SAWS Technology design	The required level of detail will depend on the SAWS technology being developed.
o RECORD-KEEPING	This is an administrative requirement to publicly record an action or an activity, such as the type and size of a septic tank installed.	o Site evaluation test o As-built drawings o Inspection results o Septage pump-outs, transfer, and disposal records o Water quality monitoring results	Information is the life-line of a SAWS management system. It is essential for evaluating the feasibility of SAWS technology or for monitoring performance. Key considerations in developing record-keeping requirements include: administrative ease; cost burden placed on recorder; and use of data.
o PERMITS	A permit is a written warrant granted by a public agency conveying the right to conduct a specific activity. A permit may also specify the location of the activity and the time period.	o Installation (or construction permits o Operating (or maintenance) permits o Septage hauler permits o NPDES discharge permits	This is one of the most widely-used techniques for ensuring an ordinance or code is implemented. Permits may be one-time for such activities as septic system installation; or renewable for regulating on-going activities such as operation of a wastewater system.
o INSPECTION	This in a basic enforcement tool for verifying a permitted order or for evaluating system performance.	o Site evaluation inspections o System installation inspections o System operating inspections o Pre-sale inspection o Water quality surveys	Inspections are time-consuming and require sufficient and skilled personnel; key considerations in developing an inspection program include: frequency of inspections, level of detail, and legal access to a site.

EXHIBIT 1 (Cond.)

o LICENSING, CERTI-	These are controls over key actors (and their activities) involved in the SAWS management process. Licensing regulates an actor by imposing limitations or conditions on those performing a particular activity. Certification is a confirmation or assurance that one is qualified to perform an activity Registration is less restrictive than the above techniques in that it only requires a person to inform a public agency that they are involved in an activity.	o Soil tester o System designer o System installer o System operators o System inspectors o System repairers o Septage pumpers	The techniques are attempts to ensure proper performance of an activity. For many activities, these techniques substitute for public inspection activities or for public assumption of activities. However, periodic inspections are necessary for quality assurance.
o BONDS	This is a financial requirement placed on a person in which the person is answerable for inadequate performance of an activity. This is similar to a guarantee.	o Performance bonds placed on any of the actors listed directly above.	This technique requires performance standards to be spelled out which may be difficult to do. Another problem revolves around the ability to pinpoint responsibility for poor performance.
o TECHNICAL ASSISTANCE	This is an educational technique. The following activities may be included under this technique: training, public information, guidebooks/manuals, and workshops.	o Training of any of the actors listed above o Homeowner's on-site system maintenance manual o Water conservation information booklet	This is a low-key non-regulatory approach. Its cost-effectiveness needs to be carefully considered, however, when used as an alternative to regulation.
o SANCTIONS	These may involve both administrative or judicial actions that seek to compel compliance with an ordinance or code.	o Warning letters or citation o Permit revocations o Fines and penalties o Damage or cost recovery o Property liens	There is a range of informal and formal actions that can be taken under this technique. In general, this is a "last resort" type of implementation measure. It is perhaps most widely used to compel an on-site system owner to correct a problem or failure.
o GRANTS AND LOANS	These are cost-sharing mechanisms designed to subsidize a project or an activity.	o Local, state, or federal funds used for new system installation or for rehabilitation of problem systems	This is a very powerful incentive for correcting problem systems. Use of federal funds for rehabilitation of privately-owned systems is, however, constrained by eligibility restrictions.

INSTITUTIONAL ARRANGEMENTS

The final component of a SAWS management strategy is the arrangement of institutions and actors to manage and finance the SAWS management services. The following tasks are involved in developing institutional arrangements.

- Determining public ownership options for wastewater systems
- Determining the distribution of SAWS management and performance responsibilities among public agencies, homeowners, and private sector entities
- Determining legal authority required for SAWS management functions
- Determining appropriate public financing mechanisms

Public Ownership

One of the distinguishing features of SAWS management in comparison to conventional wastewater management is the issue of system ownership. In conventional wastewater management, facilities are traditionally owned and operated by public agencies. Typically, these are local agencies, such as municipalities, counties, and special districts. Most existing on-site systems and many small scale centralized systems, however, are owned by the property owner or by private institutions, such as developers, homeowner associations, corporations, and private utilities. One of the key decisions in developing institutional arrangements concerns public ownership. The major issues are listed below.

- The type of systems to be owned publicly
- The portions of systems to be publicly-owned
- Public ownership of new, existing, or both types of systems
- Agency(ies) to assume ownership

In evaluating these issues, SAWS planners should consider the following factors.

- The amount of control needed over the operation and maintenance of systems
- Liability
- Cost distribution
- Federal funding eligibility

Each of these issues is discussed in the paper on "Personal and Property Rights and SAWS Authority Liability".

Distribution of SAWS Management Responsibilities

This task is concerned with the allocation of SAWS management responsibilities between the public and private sector. It is unlikely that one centralized agency will perform or manage all of the management services in a SAWS program. For some services it will be cost-effective to let the property owner or a private firm perform the management task. Potential management agencies are listed below.

- Municipality (including cooperative agreements)
- County government
- Regional planning agency
- State agencies
- Soil and water conservation districts
- Special district or service district (single or multiple purpose)
- Private utility
- Private contractors (septage haulers, installers, etc.)
- Property owner's association (nonprofit corporation)
- Rural cooperative
- Developers

Legal Authority

The decision to select a particular SAWS management agency is partially determined by the existing or readily attainable legal authority of existing public agencies. On the broadest level, the type of legal authority required for SAWS management will depend on two factors: the type of management functions to be performed; and the type of implementation measures used.

The typical legal responsibilities of a SAWS management agency are listed below.

- Power to regulate location and density of pollution generators
- Power to set standards
- Power to set system evaluation procedures
- Power to enter onto private property
- Power to issue permits
- Power to seek abatement of a public health nuisance
- Power to assess penalties
- Power to seek an injunction in system construction
- Power to require recordkeeping
- Authority to hire staff or contract out for services
- Authority to charge fees and collect revenues
- Authority to incur debt
- Authority to accept grants
- Power to require performance bonds
- Authority to license/certify/register private contractors and consultants
- Authority to grant variances

- Ability to sue or be sued

- Ability to acquire or lease property and equipment

- Authority to own and operate wastewater facilities

Generally, the greater the regulatory role assumed by the SAWS management agency for each management function, the more legal authority the agency must hold.

Public Financing Mechanisms

If a public agency regulates a private contractor, performs the SAWS management activity itself, or owns and operates SAWS technology, it will require a source of funds. The choice of public financing methods is one of key issues in developing institutional arrangements. The choice of public financing methods will initially be related to the types of costs expected to be incurred. Two main categories of cost are operating and capital costs. Typical SAWS operating and capital costs and sources of funds are discussed in the separate issue paper, "Cost Distribution".

SUMMARY

To develop a SAWS management program, planners must begin by answering three questions. What management services should be provided? What regulatory or other incentives will be used to enact the management measures? And which agency or organization will be responsible for running the program and financing it? In developing a program, the planners must start by defining the services to be included in the program. Then they must consider these range of options for implementing, managing and financing the wastewater management program options for their community.

SAWS MANAGEMENT PLANNING METHODOLOGY

INTRODUCTION

The purpose of this paper is to present a planning framework for considering SAWS management alternatives. This framework presents an approach for developing and evaluating options for SAWS management. The paper presents the methodology in a concise form. Several papers accompany this methodology and detail some of the planning issues raised in this paper.

AN OVERVIEW OF THE METHODOLOGY

The development of a SAWS management program should proceed in a step-by-step process. There are literally hundreds of possible combinations of management functions, implementation measures, and management responsibilities. Using an analytical approach, however, keyed to the needs and characteristics of a particular area, the SAWS planner will be able to reduce the number of choices to a manageable and appropriate number.

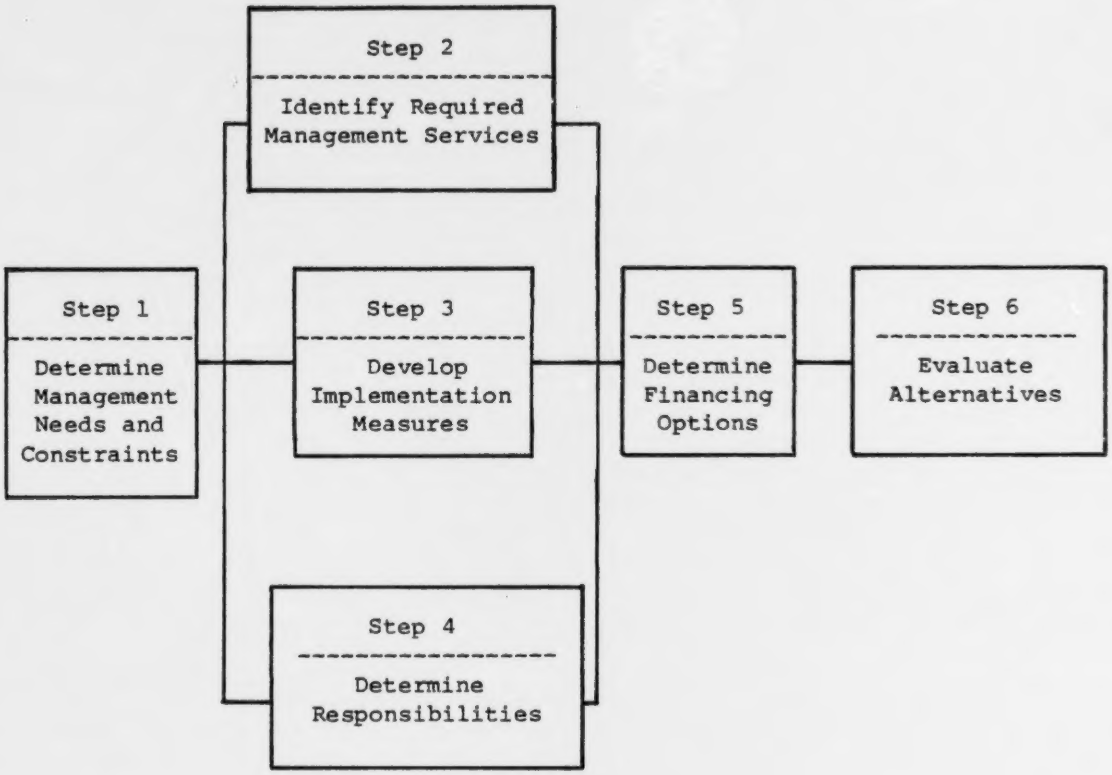
A procedure for developing a SAWS management program should include the following steps and is illustrated in Exhibit 1.

- Step 1: Determine Management Needs and Constraints
- Step 2: Identify SAWS management services to be provided
- Step 3: Determine how services will be implemented
- Step 4: Determine who will provide services
- Step 5: Determine how services will be financed
- Step 6: Develop and evaluate SAWS management alternatives

The purpose of each step and information to consider at each point in the planning process are presented on the following pages.

EXHIBIT 1

SAWS MANAGEMENT PLANNING METHODOLOGY


Step 1
Determine Management Needs and Constraints
Step 2
Identify Required Management Services
Step 3
Develop Implementation Measures
Step 4
Determine Responsibilities
Step 5
Determine Financing Options
Step 6
Evaluate Alternatives

STEP-BY-STEP PROCESS

Step 1: Determine Management Needs and Constraints

The purpose of this step is to determine SAWS management needs for the planning area and to determine what constraints (institutional, financial, and technical) should be considered in developing a SAWS management program.

Step 1 starts with an inventory of the factors that will shape the management needs of the planning area. The information to be examined should include the following factors.

- Existing and proposed service area
- Type of existing and proposed wastewater facilities
- Existing SAWS management services
- Existing and potential management agencies (both public and private)
- Existing implementation measures
- Available regulatory authority
- Attitudes towards public management and community growth

The principal product of this portion of Step 1 is a summary chart showing what SAWS management is being performed, who is providing management services, and how the management services are being implemented. (See Exhibit 2 for an example.) Two of the factors--service area and system participation--deserve additional comment.

The service area is an important aspect of the SAWS management planning process since it affects the type of management agencies that can be considered later in the process. For many planning efforts, the service area may be self-evident. If you are a county planner, for example, it may coincide with the county boundaries since that is the only area that you have jurisdiction over.

EXHIBIT 2

EXAMPLE SUMMARY CHART OF EXISTING MANAGEMENT SERVICES AND INSTITUTIONAL ARRANGEMENTS

Note:: m=manage/regulate, p=perform	State	County	Special District	Private Contractor	Property Owner	Comments
PLANNING						County uses Suburban Systems, Inc. to do its wastewater facilities planning.
Facilities plan preparation		M,P		P		
Land Use planning		M,P				
SITE EVALUATION						County relies on state sanitary code for site evaluation procedures and for regulation of soil testers.
Guidelines, procedures, criteria	M					
Site suitability analysis		M		P		
Evaluator licensing/certification/ training	M,P					
SYSTEM DESIGN						
Standards, procedures, criteria						
System design						
Design review			Etc.			
Design licensing/certification/ training						
Performance bond						
INSTALLATION						
Permit issuance						
Install system						
Inspection(s)						
As-built plan						
Installer licensing/certification/ training						
Performance bond						

It may be prudent to delineate a service area smaller than the boundaries of a political jurisdiction for the following reasons.

- The need for a new SAWS management program may be confined to a small area. Attempts to develop a geographically-inclusive SAWS management program may be politically unfeasible. For example, an environmentally sensitive area, such as an area around a lake, may have the greatest need for new SAWS management practices.

- There may be a unit of government (such as a village) a special district, or a private body (such as a homeowner's corporation) which covers a small area. If these management agencies have a significant interest in developing a SAWS management program, you should consider initially limiting your effort to their service area boundaries.

Similarly, there may be political or convenience reasons to consider a larger service area than originally anticipated. If, for example, you are a small community or village, there may be opportunities for economies of scale and access to more management expertise by using a larger area than your own jurisdiction.

In general, you should think creatively in defining your service area--there may be technical, economic, and political gains for SAWS management by doing so.

Determining which systems should participate in the management program is a very important aspect of program design. The following points should be considered when defining system participation.

- Attitudes Toward Public Management--Public management of centralized wastewater facilities is a traditional notion in most communities. Owners of on-site systems, however, may question any public intervention into the operation and maintenance of existing privately-owned on-site systems. It is crucial to find out about such resident concerns before developing detailed and sophisticated SAWS management approaches. This fact underscores the need for active and early public participation efforts in SAWS management--they may make the difference in developing an implementable SAWS management program.

- Administrative Concerns--Local officials may desire to exclude for consideration in the overall SAWS management planning process existing large centralized facilities, particularly if on-site systems are the main technologies being considered in SAWS management. Because of the substantial differences in operation and maintenance between large conventional facilities and on-site systems, this may make administrative sense. There are, however, a number of centralized SAWS technologies that should be considered for an overall SAWS management plan.

- Economies of Scale--The number of systems, whether centralized or on-site facilities, will affect the amount of management required and possible economies of scale in management approaches.

- Financial Considerations--EPA may require that certain systems be included in a SAWS management program in order for them to qualify for EPA rehabilitation funding. This is an important consideration if you are in an EPA facilities planning process and are considering the use of EPA funds to rehabilitate problem on-site systems built prior to December 27, 1977.

- Potential Facility Risk--SAWS management planners should consider the potential for failure of existing and proposed systems in deciding which systems should be covered by SAWS management.

  This is important in communities dominated by on-site systems, particularly ones installed prior to recent stringent sanitary codes. Failures of on-site soil absorption systems are largely a function of age. Using information from the local Board of Health or from the facilities planning process on existing systems and problems/failures occurring each year, SAWS planners can estimate the probable future failure rate/performance for on-site systems. This will provide a rough estimate of the management needs for the problem correction management function.

- Sensitivity of Water Resources--This factor is essentially a part of the risk assessment. Not only should the potential for failure of a system and the impact on users be considered, but the water quality impact of failure or poor performance should also be considered. For example, a municipal ground water aquifer or a small lake may be two sensitive water resources in a community. Failure of wastewater facilities in these two areas may produce more than just inconvenience to system users or isolated public health impacts.

Step 2: Identify SAWS Management Services to be Provided

Once the geographic area and the systems slated for SAWS management are determined, the next step is to identify the management services to be performed. SAWS management required for systems varies by SAWS technology. In this second step, the SAWS management planners look at the management requirements of each SAWS technology and outline the type and extent of SAWS management services for each technology.

As discussed in the issue paper, "Components of SAWS Management," there are several management categories that correspond to the life cycle of SAWS. The categories are listed below.

- Planning
- Site evaluation
- Design review
- Installation and construction supervision
- Monitoring
- Routine maintenance assurance
- Problem correction

It is unlikely that you would consider a SAWS management program with fewer categories. Even in situations where you are at the local level and the state, for example, has complete jurisdiction over site evaluation and design review, you will want to consider possible modifications at the local level for both of these functions.

The most important step then in this task is to establish the services or activities that are required under each of the management categories. This should be done for each SAWS technology in the study area. You will want to consult facility operators or engineers to pinpoint these activities.

Some of the "required technical activities" will require some judgement. For example, ground water monitoring programs (particularly in situations not involving the use of EPA funds for on-site system rehabilitation) should be considered on a case-by-case basis. The potential sensitivity of water resources to system effluent and risk potential of the system will be a deciding factor in many cases.

Step 3: Develop Potential Implementation Measures

Step 4: Determine Institutional Responsibilities

These two steps should be considered simultaneously.

In assigning responsibilities, there are several considerations that should be considered in the proper sequence. The first consideration is ownership. In this step you will decide on the following ownership responsibilities.

- Which systems are to be publicly owned
- Portions of systems to be publicly owned
- Ownership of new vs. existing systems
- Agencies to assume ownership

Public ownership allows the most control over the operation, maintenance, and repair of a system. Thus it may be the most appropriate consideration for some facilities in reducing risk. But it also provides the most chance for liability for the public agency owning the system. The public ownership issue in SAWS is considered in the paper, "Personal and Property Rights and SAWS Authority Liability."

Once ownership has been decided, the next issue to consider is the role of the management agency for each management service. The planners must decide whether a management agency should perform the management service or regulate somebody else's performance of the service. The selection of implementation measures and the assignment of responsibilities is dependent on this performance role vs. regulatory role decision. Essentially the decision on management agency role and the type of implementation measures to be used requires you to strike a balance between control and risk. SAWS should be managed to miminize the risk of failure, but at an appropriate level of control. Excessive regulation or bureaucracy may not only be difficult and expensive to manage, but may also be difficult to implement. Thus, the selection of implementation measures and the assignment of responsibilities should consider the factors listed below.

- The control necessary to minimize risk to an acceptable level
- The availability, ability, and interest of agencies to be involved in SAWS management
- Whether agencies should perform management services or regulate the performance of services

Step 5: Develop Public Financing Options

The choice of public financing will be dependent on the factors listed below.

- Types (capital and operating) and amounts of costs
- Institutional arrangements developed above
- Legal constraints on funding mechanisms

The financing options are discussed in a separate paper, "SAWS Cost Distribution." As discussed in that paper the selection of public finance options will significantly affect cost distribution. The types of public financing methods to consider will include: general operating revenues, property taxes, special assessments (one-time and continuing), hookup fees, and user charges.

Step 6: Develop and Evaluate Alternatives

In this final step, alternatives for each management service are developed and evaluated. Each alternative for a management service would include implementation measure(s) and management agency responsibilities. In packaging alternatives for each management service category, you should review the following points.

Avoid choices that don't go together well. Be consistent. If you start out with a permit system for installation and maintenance, don't abandon it for the problem correction phase. If you have a public agency doing routine maintenance inspections,then they should also do them for problem correction.

Avoid complexity. Your comprehensive SAWS management alternatives should be acceptable to system owners as well as to the proposed management agencies. In general, you should try and limit the number of different management agencies to three or four, at most, under each option.

Consider the impacts on your pocketbook. At this point you should do some quick calculations of cost impacts and avoid alternatives that are outrageously expensive.

EVALUATION FACTORS

The evaluation factors that should be considered in selecting an alternative management program are summarized below.

- Effectiveness--This factor encompasses SAWS operational performance and water quality impact. Satisfactory operation alone is not the only measure of SAWS effectiveness--the system also has to minimize both surface and ground water quality degradation.

  Until the 1970s many state sanitary codes were based more on operability concerns than on water quality impact considerations. This has changed in recent years, but there are still some unknown water quality impacts associated with the use of on-site systems. One of the SAWS management implications with respect to water quality impacts is the greater use of groundwater monitoring. Because of the difficulty of measuring SAWS performance, the concept of risk is a useful one to consider for this evaluation factor. Specifically, another way of maximizing SAWS effectiveness is to reduce the risk of system failure or problems to the greatest extent possible. For example, one way of measuring this effectiveness is to measure the annual rate of system repairs for a particular area.[1]

- Cost--There are several ways to consider cost issues. (See separate issue paper on "Cost Distribution".) The first order consideration is the total cost of an alternative or strategy--including both capital and operating costs. In addition, cost distribution may also be important in evaluating specific SAWS management strategies. Basically, SAWS management strategies may mean that management agencies are assuming additional costs or are imposing additional costs on individuals or private firms.

  Management agency costs may include capital costs (the local share after State and Federal contributions) and O&M costs for publicly-owned facilities as well as administrative costs associated with SAWS management. The SAWS management agency may also represent a distribution point for costs.

  Management agency costs may be distributed to individuals and private firms through a variety of financing mechanisms, including user charges, taxes, fees, and special assessments.

  Individual and private firm costs include both direct compliance costs--the capital and O&M costs associated with systems--and regulatory costs. The latter costs include the costs of permit fees and the like. You may also want to consider the costs associated with secondary impacts of SAWS management strategies, specifically, the fiscal and public service costimplications of the land use impacts associated with the SAWS management strategy.[1]

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[1] See Saxton, Gary B. and Joseph M. Zeneski, "Prediction of Septic System Failures," Journal of the Environmental Engineering Division, June 1979, p. 503.

- Liability--This is an issue that may be easily overlooked by SAWS planners, but one that should be carefully weighed in developing a SAWS management program. Because of its complexity, a separate issue paper is included: see "Personal and Property Rights and SAWS Authority Liability". The types of liability issues of concern in SAWS management include damages associated with system failures, system repairs, and other personal and property damages.

  In SAWS management, you may often have to trade off the liability question with the effectiveness evaluation factor. Generally, the greater the amount of SAWS control (ownership representing the extreme) exerted by a management agency, the greater the potential liability incurred by the agency for problems that occur with SAWS.

- Implementation Feasibility--The evaluation factors listed above may be perceived as impacts or consequences of a SAWS management alternative or strategy. Implementation feasibility, on the other hand, is a judgement of the likelihood of a SAWS management alternative or strategy being implemented. Implementation feasibility criteria encompasses the following three criteria.

  The legal authority issue covers whether or not the implementation measure or institutional arrangements are legal.

  Administrative capability deals with whether there exists an agency or agencies capable and willing of performing administrative responsibilities.

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[1] See Urban Systems Research and Engineering, Inc., Socioeconomic Impacts of Water Quality Management Strategies, Prepared for EPA, September, 1980.

Finally, the review of political acceptability addresses whether there is public support for the implementation scheme.

Specific criteria for assessing implementation feasibility are shown in Exhibit 3.

The selection of a preferred alternative can use the format shown in Exhibit 4. In applying this evaluation format, several points should be considered as listed below.

- You should work out the details for each of these alternative as much as possible. For example, determine the actual staffing costs under each of the alternatives; examine the liability issue with outside experts; consider the mechanics and feasibility of any third party agreements that are proposed; calculate the revenues from permits.
- It is not absolutely necessary to come up with numerical rating scores for each evaluation factor and a total score for each alternative. You may wish to simply rank the alternatives from most preferred to least preferred based on the comments and calculations.
- You should obtain wide public comment and input from all of the existing and proposed management agencies in the evaluation process. Public meetings and small workshops should be used to solicit comments and preferences.
- Do not necessarily keep these alternatives rigid during the evaluation. If there is clear cut opposition to certain features in an alternative, then consider adjustments and refinements that will make the alternative more acceptable.

EXHIBIT 3

IMPLEMENTATION FEASIBILITY EVALUATION CRITERIA

Legal Authority

- Existence of adequate statutory authority or power.
- Legitimacy of purpose intended to be served by implementation measure.
- Potential of the measure to violate equal protection rights, i.e., to be discriminatory, arbitrary, or unreasonable.
- Extent to which water quality measures are confiscatory--involving a taking or a diminishing of private property values without just compensation.

Administrative Capability

- Coordination with related services/institutions.
- Clarity of responsibilities and relationships.
- Potential for voluntary compliance.
- Flexibility.
- Adequate financial, manpower, and informational resources.
- Jurisdictional adequacy.
- Overlapping/fragemented responsibilities.

Political Acceptability

- The degree to which the problem being addressed is perceived as an important public need relative to other community or environmental needs.
- The extent to which the implementation measures and institutions conform to local traditions and attitudes concerning government role.
- Expectation of success--certainty of outcome; implementation time required.
- The extent to which affected groups or local governments have access to decision-making in the institutional arrangements.

Exhibit 4

SAMPLE FORMAT FOR EVALUATING SAWS MANAGEMENT ALTERNATIVES

Alternative:____________

MANAGEMENT SERVICES	RESPONSIBILITIES (note: M=manage; P=perform)			PUBLIC FINANCE MECHANISMS
	Public Agencies	Property Owners	Private Firms	
PLANNING				
Facilities	Board of Health(M,P)		P	Prop. Taxes, general revenue
Land Use Planning	Planning Board(M,P)			Prop. Taxes, general revenue
SITE EVALUATION				
Guidelines, procedures, criteria	State Health Dept. (M)		P	State general revenue
Site suitability analysis	Board of Health (M)		P	Permit fee
Etc.				

EVALUATION FACTOR	COMMENTS AND CALCULATIONS	OVERALL RATING SCORE (1-10)
Effectiveness		
Public costs		
Homeowner costs		
Public liability		
Implementation Feasibility		

SUMMARY

This section outlines a six step process for the development of SAWS management plans. The process starts with a determination of management needs, and then proceeds to service selection. After services are selected, the next steps are to determine how the services will be enacted, who will provide them and how they will be financed. The final step is an evaluation of each management program alternative. Effectiveness, cost, liability, and implementation feasibility are the key evaluation criteria for SAWS management programs.

KEY ISSUES

PERSONAL RIGHTS, PROPERTY RIGHTS AND SAWS LIABILITY

INTRODUCTION

This issue paper is concerned with the three issues listed below.

- What elements of a SAWS should the management authority actually own?
- How can the SAWS authority provide for access to elements of the system on private property?
- What is the liability of the SAWS authority for its activities?

In a sense, the first two issues are preliminary questions that must be answered before the third question can be resolved. The extent of ownership and the method of access will have a direct bearing on the issue of liability.

To briefly discuss these issues, it is necessary to generalize many of the statements. The legal issues of easements and liability, for instance, are extremely complex and are discussed in voluminous legal treatises. This paper sets out some of the critical points SAWS planners should keep in mind when considering these issues and outlines the general legal rules that govern the area. However, specific legal doctrines vary extensively from state to state and it is essential that any SAWS authority obtain legal counsel familiar with state laws. In a number of areas, particularly that of liability, there are different rules for municipalities, counties and special districts. For the sake of simplicity, these issues will be discussed as they affect municipalities. The reader may thus assume, except where explicitly noted otherwise, that all references are to municipal liability.

Another point to keep in mind is that it is legal obligations that are being discussed in this section. In some instances a SAWS authority may not incur legal liability for damages. The further issues of whether there are economic, public relations or ethical reasons for assuming liability are policy, not legal matters.

OWNERSHIP AND ACCESS AND EPA GRANT REQUIREMENTS

EPA grant requirements for SAWS can be found at 40 CFR 35.918 and in EPA's "Facilities Planning 1981." Where individual on-site systems are involved one of two sets of criteria must be met in order to establish grant eligibility.

1. If the systems are owned by the public applicant and the systems service principal residences (excluding second homes, vacation or recreation residences) the system is grant eligible.[1]
2. If the systems are privately owned, grant eligibility is established if;[2]

- the residences were constructed before December 27, 1977;
- it is certified by the applicant that public ownership is not feasible;
- access to each system is assured by an easement or covenant[3]; and
- a public body will be responsible for regulation and inspection.

OWNERSHIP

Does the SAWS authority need to own individual septic tanks or other facilities in a decentralized system? Who should own the pumps in a pressure sewer system?

Traditional sewer agencies own the collector lines in the street; however, actual hookup lines from a residence to the collector are the responsibility of the property owner. SAWS management agencies are faced with different ownership options.

- Alternative collection systems

  Mechanical equipment for vacuum and pressure sewers may be located on private property.

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[1] 40 CFR 35.918(a)(1)&(2).

[2] 40 CFR 35.918-1

[3] 40 CFR 35.918-1(h)

- Individual wastewater facilities

  Does the Authority intend to repair and replace existing septic systems?

- "Old" versus "New" Systems

  Existing on-site systems may continue to be the responsibility of the property owner. New and replacement systems may be more directly controlled by the authority.

In determining the need for outright ownership versus rights of entry and inspection, several factors should be considered.

- What are the relative costs?
- What are the liabilities?
- Which approach is more acceptable to the public?
- Which approach will allow the system to function best from a water quality viewpoint? From an administrative perspective?
- What is the effect on grant eligibility?

Ownership of the system is generally more expensive and complex and will create a larger potential liability (see Liability Section) for the SAWS authority. Because of this, unless there is a clear advantage, such as improved water quality or increased public acceptance, the elements of a SAWS should be left in the hands of the property owner.

ACCESS TO PRIVATE PROPERTY

Even if a SAWS authority retains ownership of elements of systems on private property the authority will still have to be able to gain access to the system for inspection purposes and possibly to carry out construction, repair and rehabilitation. The most common methods of gaining such access are a statutory right of entry, and acquisition of easements.

STATUTORY AUTHORITY

There are three types of statutes which allow entry onto private premises when on-site disposal systems are being used.

- Nuisance statutes and police powers
- Licensing or permitting statutes
- Special district statutes

Nuisance

Septic tanks and cesspools are considered "nuisances per se" and municipalities are given wide latitude in taking actions necessary to ensure their adequate performance.

> "Under specific power, by virtue of their police powers or by reason of their power to prevent and abate public nuisances, municipal corporations ordinarily can exercise regulation and take necessary action, including prohibition of certain practices and conditions, and including abatement of nuisances, with respect to sewerage, drainage, and other matters pertaining to water flow, where and to the extent the municipal regulation or action has a reasonable relationship to public sanitation, health and welfare."[4]

> "If the owner of property causes or permits a nuisance...on his land, a city has the authority to order the nuisance abated and upon failure of the owner to comply therewith to enter upon the property, abate the nuisance and assess its expenses in so doing against the owner of the property."[5]

Licensing and Permitting

Licensing and permitting statutes and regulations for on-site disposal usually contain provisions allowing access for the purposes of enforcing regulations. For instance, Arkansas regulations provide that "...it shall be the duty of the owner or occupant of the property to give the (inspector) free access to the property at reasonable times for the purpose of making the installation inspection".[6] Indiana regulations grant authority to "The Health Officer or his agent...to enter upon all properties at the proper time for purposes of inspection, observation, measurement, sampling and testing necessary to carry out the provisions of this regulations."[7]

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[4] McQuillan, *The Law of Municipal Corporations 24.256.*, Third Edition, 1977 cited as McQuillan MunCorp.

[5] Ibid. 24.257

Special Districts

States that have enacted legislation allowing On-Site Management Districts to be established generally provide for rights of access. The Illinois Municipal Wastewater Disposal Zone Act provides that:

> If a zone is established, an authorized representative of the municipality, upon presentation of his or her credentials, shall have the authority to enter at all reasonable times to any premises on which a water pollution, waste, or contamination source, including, but not limited to, septic tanks, is located for the purpose of inspection, rehabilitation or maintenance of such source, including securing samples or discharges therefrom, or any records required to be maintained in connection therewith by federal, State, or local law, order regulation or rule.[8]

The act requires that 30 days notice be given to the property owner before any routine inspection, and at least 60 days notice of any work other than routine inspection or maintenance.[9] The municipality is also authorized to enter upon the premises to undertake actions "necessary to remedy an emergency condition creating an immediate danger to health."[10]

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[6] Arkansas Rules and Regulations Pertaining to Sewerage Disposal Systems and Installers, Sec. 7.3b.

[7] Indiana State Board of Health, Rule 410 IAC 6-8, Residential Sewage Disposal Systems, Sec. 12(s).1

[8] P.A. 80-1371, Sec. 15.

[9] Ibid, Sec. 18, 19.

[10] Ibid, Sec. 20

The Illinois notice provisions are a good idea since they both limit the intrusiveness of the inspection program and provide a tool for helping maintain good public relations. However, even with a statutory right of entry problems may occur. The two major issues of concern to a SAWS authority should be refusal of entry and breadth of authority.

Refusal of Entry

In most instances property owners will voluntarily grant permission for SAWS personnel to enter their property. However the Fourth Amendment to the United States Constitution establishes "the right of the people to be secure...against unreasonable searches". The Supreme Court has held that searches carried out in connection with fire and building codes are subject to the "reasonableness" requirement.[11] This Fourth Amendment protection extends beyond the buildings to land within close proximity to the dwelling.[12] Because of this if a property owner refuses entry a search warrant will have to be obtained. California's On-Site Wastewater disposal Zone Act provides for this contingency stating that:

> ...any authorized representative of the district, upon presentation of his credentials, or, if necessary under the circumstances, after obtaining an inspection warrant pursuant to Title 13...of Part 3 of the Code of Civil Procedure, shall have the right of entry...[13]

State codes usually establish the procedure by which such warrants must be obtained. In Michigan the Public Health Code[14] procedure for obtaining an inspection or investigative warrant requires the inspector to submit an affidavit on oath establishing grounds for issuing a warrant. Sufficient grounds exist if:

> (a) Reasonable legislative or administrative standards for conducting a routine or area inspection are satisfied with respect to the particular thing, premises, place, person, record, vehicle, incident, or event.

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[11] See City of Seattle, 387 US 541.

[12] Camara v. Municipal Court, 387 US 523 and Wattenberg v. US 388 F2d 853.

[13] Chapter 1125 of 1977, Article 3, Section 6977.

[14] Act 368, PA of 1978.

(b) There is reason to believe that noncompliance with laws enforced by the state or local health department may exist with respect to the particular thing, premises, place, person, record, vehicle, incident, or event.[15]

Breadth of Authority

Care should be taken by the SAWS authority to ensure that the types of actions that can be taken upon entry are sufficient to carry out the purposes of the SAWS program. If the intent is that SAWS management actually carry out repairs of existing systems, entry onto private property under regulations allowing such entry for purposes of ascertaining non-compliance with regulations will not be adequate. Entry regulations must explicitly include the full range of SAWS activities contemplated in the specific instance. For example, the Illinois Municipal Wastewater Disposal Zone Act authorizes entry for the purposes of "inspection, rehabilitation or maintenance."[16]

EASEMENTS

Easements are used when full property ownership is unnecessary or too expensive. An easement gives the owner of one parcel of land the right to use land of another for a special purpose. Easements must be either purchased (sold voluntarily or through eminent domain) by the SAWS agency or donated by the owner. Gas, electric and telephone companies are regularly granted easements giving them the right to install and maintain service lines on private property.

The advantage of an easement purchase program is that it would give clear legal access to the SAWS authority at all times without the necessity of obtaining the owners permission or a warrant.

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[15] Ibid, Sec. 333.2243. See also Institutional Alternatives for Septic System Maintenance Districts in Southeast Michigan, Draft Report by Lillian F. Dean, September 1980.

[16] Sec. 15.

The disadvantages of such a program are the cost and time involved in negotiating purchase and the possibility that a few recalcitrant owners may delay the entire project. In fact if it was not for the Federal funding aspect it is probable that a SAWS authority with a well drafted "right of entry" statute could achieve most of the same things that an easement purchase program was designed to achieve.

If it is decided to obtain easements a careful examination of state law on the subject will be required. Property law is a complex and quirky legal topic with substantial variation among the states. Any easement program will have to address the following questions.

- Is there a termination date for the easement? Will the easement be transferable to subsequent owners?
- How can the easement document be best drafted to ensure adequate freedom of action for the SAWS authority?
- Is the easement an "appurtenant easement" or an "easement in gross"?

What are the rights and obligations of both parties once the easement has been granted? The grantee (the owner of the "fee") still has substantial rights:

> Generally with regard to an easement acquired by a municipality...the fee or servient owner has the right to use the land in any way not inconsistent with rights granted under the easement, or which does not interfere with those rights.[17]

On the municipality's part there are also obligations, for instance:

> ...where a municipality has an easement across property to construct a sewer, it has the obligation of protecting the owner's property even though such obligation is not expressly covered in the easement instrument.[18]

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[17] Los Angeles v. lgna, 208 Cal App 2d 338.

[18] McQuillan MunCorp 31.12.

SAWS MANAGEMENT LIABILITY

The Problem

When human beings undertake any activity, whether as individuals or in their corporate guises, they incur legal obligations to carry out their activities with a certain level of competence. If this level is breached they become liable to an injured party for damages suffered as a result of their actions.

Liability Theory

A SAWS management authority will be potentially liable as a result of its activities. Possible damages from SAWS activities are listed below.

- Backup from systems into dwellings
- Collapse of subsurface area
- Shifting of dwelling foundation during installation
- Pollution of private or public wells
    - Damage to property during installation (for example, shrubbery)
- Personal injury during construction phase

All these activities give rise to potential liability. Claims against a SAWS authority may be based upon different theories of recovery of which the most prominent are negligence and nuisance.

Negligence is conduct falling below a standard established by the law to protect others against unreasonable risk of harm.[19]

Nuisance can be anything that jeopardizes a person's life, breath or property, gives offense to bodily senses, or otherwise obstructs the reasonable and confortable use of property. Conduct does not have to be negligent in order to constitute a nuisance.[20]

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[19] Restatement of Torts, Sec. 282.

[20] Once again this is a simplification of the concept. A leading treatise states that "there is perhaps no more impenetrable jungle in the entire law than that which surrounds the word "nuisance"...there is general agreement that it is incapable of any exact or comprehensive definition". Prosser, the *Law of Torts* p. 57.

Predicting the extent of SAWS liability in any given fact situation depends upon the following factors in the jurisdiction where the action occurs

- Doctrines of municipal immunity
- Statutory requirements
- Case law

Municipal Immunity

On a beautiful spring day in 1788, Mr. Russell's horse fell through a village bridge in the County of Devon, England. Mr. Russell sued the County[21] seeking compensation for injury to his horse. His claim was denied on the grounds listed below.

- There was a lack of a corporate fund from which compensation could come.
- There was an absence of legislative intent to impose liability.
- There was a need to avoid multiplicity of suits and inconvenience and costs to the public.

Thus was born the doctrine of municipal immunity. The doctrine found almost immediate acceptance in American courts. However almost as soon as the doctrine was accepted, courts began carving out exceptions in order to mitigate the harshness of the rule. During the 19th century a number of convoluted distinctions arose which courts used to determine whether a particular governmental activity carried with it an immunity. These elusive distinctions have confused generations of lawyers and jurists and have led one court to state in exasperation that the "rules which courts have sought to establish in solving this problem are as logical as those governing irregular French verbs."[22] Applying the same distinctions some courts found that the operation and maintenance of sewers conferred immunity while other courts found the contrary, although both sides found it difficult to clearly explain their reasons.[23] In general however, the trend was to gradually erode away municipal immunity.

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[21] Russell v. The Men of Devon, 100 Eng. Rep. 359 (1788).

[22] Weeks v. City of Newark, 62 NJ Super 166, 162 A2d 314.

[23] See Prosser, The Law of Torts, p. 982.

A direct assault against the doctrine began in the 1950's as state courts and legislatures began to abolish the doctrine of municipal immunity. Many states have by now abolished the immunity, severely restricted it and/or enacted Tort Claims Acts defining municipal liability. The law in your area should be checked to determine its status and its applicability to your proposed SAWS management program.

Where municipal immunity still survives through common law or by statute it may be affected by the municipality's insurance coverage. In states where common law immunity exists a minority of jurisdictions have held that where a liability insurance policy protects a governmental unit against liability, the otherwise-existing immunity of the unit is removed.[24] Statutes may have a similar effect. The Illinois Local Governmental and Governmental Employees Tort Immunity Act[25] provides that the immunity it confers is lifted where the municipality has secured insurance.[26]

Statutory Requirements

State statutes may establish the terms and conditions by which a municipal or special district immunity may be limited. For instance the Illinois Local Governmental Immunity Act mentioned previously limits local immunity. In addition, statutes establishing special districts may specifically state whether the district may be sued.

Case Law

Case law is the process through which court decisions become the basis of determining what the law "is" under any given set of circumstances. This is most commonly done through the use of "precedent." In general the role of precedent is as follows. A fact situation is presented to a state court. In determining what the law is as regards these facts, the state court judges determine whether the state court has previously decided a case presenting similar facts. If the court has done so, one of three outcomes will follow.

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[24] 68 American Law Reports 2d, 1448, see also Newson v. City of Kansas City, 606 SW2d 1487.

[25] IL Rev. Statutes 1979, Cn. 85, parts 1-101, et seg.

[26] See also Porter v. City of Urbana, 410 NE2d 610.

- The court will follow "precedent" and decide the case along the lines of earlier decisions.
- The court will "distinguish" the facts in this particular case from the earlier cases and reach a different decision.
- The court will feel that the earlier decisions have reached an unjust result and will "overrule" these decisions and reach a different conclusion.

If no "precedent" is available in state court decisions, the court will look for analogies in other states and examine federal court decisions.

The derivation of case law is important for SAWS managers to understand when dealing with liability issues. It is important because for certain SAWS activities there may be clear precedents. Where a SAWS authority is operating a centralized system in which wastewater systems or pipes are connected directly to SAWS authority collector lines the situation is clearly analogous to that of a traditional centralized wastewater treatment system and courts will look to established case law in determining liability. This issue will be discussed in more detail later in this paper. Each state has had significant litigation on issues relating to municipal liability in the operation of public sewers. These decisions will provide a useful guide in predicting SAWS liability.

Where a SAWS authority operates a decentralized system with some degree of control over individual on-site disposal systems there is much less existing case law from which precedents may be drawn. Thus predicting the outcome in any particular fact situation is subject to a wide range of uncertainty.

SAWS AND TRADITIONAL WASTEWATER SYSTEMS

There has been a great body of case law produced through litigation over municipal liability for damages caused in the operation of a sewer system. A SAWS utilizing one of the alternative centralized systems such as a small-diameter gravity sewers, vacuum sewers and pressure sewers can look to this case law for guidance in determining its potential liability.

The three distinct phases in the development of a traditional centralized system: planning, construction and operation and maintenance all have different legal implications.

Planning

In general where a municipality adopts a plan for a sewerage system it is not liable for injuries to property due to any defects in the plan.[27] This is one of the few areas where there is a United State Supreme Court decision directly on point. The court has stated that:

> The duties of the municipal authorities in adopting a general plan...and determining when and where sewers shall be built, at what size and at what level, are of a quasi-judicial nature, involving the exercise of deliberate judgement and large discretion...and the exercise of such judgement and discretion in the selection and adoption of the general plan or system...is not subject to revision by a court or jury in a private action.[28]

There are three exceptions to this rule and the law in your jurisdiction should be checked to see if one of the exceptions listed below applies.

- Where the municipality recklessly adopts a clearly defective plan
- If a nuisance is created the nonliability for defective plans is no defense
- If a sewer, as planned, is found to be defective through actual experience there may be a municipal duty to remedy the situation

Construction

Generally, a municipality is liable for negligence in the construction of sewers resulting in injury related to this activity.[29] The municipality is responsible for damages caused by negligence in construction because the system when constructed becomes the property of the municipality.

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[27] 18 McQuillan MuncCorp 53.121.

[28] Johnston v. District of Columbia, 118 U.S. 19, 30 LEd 75, 6 S. ct. 923.

[29] 18 McQuillan MuncCorp 53.125.

For instance, a municipality has been held liable where a city sewer department dug a trench in the street, under a sidewalk and through the wall of Mr. Galluzzi's cellar. After replacing the wall, the trench was filled but the macadam on the street was not replaced. A heavy rain caused water to flow into the earth and through the bricks in the cellar.[30]

A municipality may also be liable for creation of a nuisance during construction. When the city of Rome, Georgia cut down Mr. Turk's hedge and fence while digging a drainage ditch on adjacent property the Georgia Supreme Court allowed him to sue on the theory that a "nuisance" had been created.[31]

Operation and Maintenance

You have adequately constructed your pressure sewer system. What is your legal liability if you fail to properly operate and maintain the system? The majority of jurisdictions agree that even where municipal immunity exists, it does not extend to the operation and maintenance of sewers.

> The duty of maintaining sewers...in good repair includes the obligation to keep them free from obstruction, and a municipality is liable for negligence in its exercise of such duty to any person injured thereby.[32]

The standard of care that should be exercised is reasonable inspections by the authority or repairs in a reasonable amount of time after notice has been given.[33] In a case brought as a result of an explosion of sewer gas in a home that injured 4 people, an Oklahoma court stated that "Reasonable diligence and care in that operation is the measure of duty."[34] The clearest statement of this doctrine is found in a Montana case.[35] In this case the Butte sewer system abutted Mr. Floyd's building. Due to leaks in the system, Mr. Floyd's building began settling and the foundation began cracking. Neither Mr. Floyd nor his tenants approved of the new angle of repose. The Court wrote:

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[30] Galluzzi v. Beverly, 309 Mass 135, 34 NE2d 492. See also 61 American Law Reports 2d, 874.

[31] City of Rome v. Turk, 219 SE2d 97.

[32] 59 American Law Reports 2d, 281.

[33] Floyd v. Butte, 147 Mont 305, 412 P2d 823; Kershner v. Town of Walden, 144 CO 67, 355 P2d 77.

[34] Davis v. Town of Cashin, 562 P2d 854.

[35] Floyd v. City of Butte, 147 Mont 305, 412 P2d 823.

> The duty of a municipality to keep its sewers in repair involves the exercise of a reasonable degree of watchfulness in ascertaining their conditions from time to time, and preventing them from becoming dilapidated or obstructed. Where the obstruction or dilapidation is an ordinary result of the use of the sewer which ought to be anticipated and could be guarded against by occasional examination and cleansing, the omission to make such examination and to keep the sewers clear is a neglect of duty which renders the municipality liable.[36]

The Burden of Proof

Mr. Crotchety comes into your office complaining that the toilet in his basement has backed up and flooded his newly finished playroom. How can you tell if Mr. Crotchety has been doing some fooling around with his plumbing and caused the problem? Does this make a difference? Well, it depends where you and Mr. Crotchety live.

Mr. Hull lived in Griggsville, Illinois. His toilet did back up into his basement. Mr. Hull had failed to install a backup water plug as was common practice. Mr. Hull had also failed to notify the city when a large hole developed above the sewer line leading to his property. The hole was over where the break occurred that led to the flooding of his cellar. A claim was brought against the city by Mr. Hull and a jury found no contributory negligence (which would have barred his suit) and returned a verdict in favor of the plaintiff. The city appealed claiming that Mr. Hull had failed to prove the city's negligence. The Appellate Court agreed that Mr. Hull had not offered such proof but found, nevertheless, that he didn't have to prove negligence in order to justify the verdict. In reaching this decision the court applied the doctrine of "res ipsa loquitur" ("the thing speaks for itself").

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[36] Ibid, p. 826.

> When an event occurs which would not ordinarily have occurred in the absence of someone's negligence, when the event has been caused by an instrumentality within the exclusive control of the defendent, and when the plaintiff has not contributed to the occurrence of the event the doctrine of res ipsa loquitur is applicable.[37]

If Mr. Hull had been unlucky enough to live in Utah he would have had to actually prove negligence since res ipsa loquitur has been rejected there.[38] He might have been in even worse shape in South Dakota or Wyoming where courts have held that obstructions and breakages are normal types of accidents which cannot be prevented by due care.[39] However in Louisiana, Mr. Hull would have found the climate hospitable towards his claim.[40] What this means is that your SAWS operation will have different options open to it if these circumstances arise depending upon the state.

Unique Aspects of SAWS Centralized System

Although in many respects an innovative centralized system may be analogous to a traditional collection system there are a couple of differences. Vacuum and pressure sewers require the placement of mechanical equipment dependent upon electricity on the individual's property. These systems may utilize elements of older pre-existing individual wastewater systems.

The SAWS authority has installed a grinder pump on private property. An electrical failure causes a sewage backup in several residences. Or a specific pump malfunctions, leading to a backup. Who is liable? A step towards finding the answer is to look at similar fact situations. One such area where litigation has been common is with defective water meters. Water meters are commonly installed by a municipality in an individual dwelling. City employees may come to read or inspect the meter. The meter is usually municipal property. Most jurisdictions have found res ipsa loquitur inapplicable in situations where a meter malfunctions resulting in damage to the plaintiff's cellar. The reason for this is that it is difficult to prove that the meter was in the exclusive control of the defendent, a pre-requisite for establishing res ipsa.[41] In many instances courts have ruled that the plaintiff failed to prove negligence[42] although in some instances liability has been found where the defect in the meter could have been readily ascertained by inspection[43] or where a reasonable inference of negligence could be drawn.[44]

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[37] Hull v. City of Griggsville, 330 NE2d 293.

[38] Reich v. Salt Lake City Suburban Sanitary District, 29 Utah 2d 125, 506 P2d 53.

[39] Shipley v. Spearfish 235 NW2d 911, Jivelekas v. Worland 546 P2d 419.

[40] Falgout v. St. Charles Sewerage District #3 351 So.2d 206.

In a case with more similiarities to the pump situation the City of Baltimore installed a water meter in an unpaved public walkway with the meter cover flush to, or just below the surface. While on a stroll Mr. Harnson stepped upon an improperly secured cover which resulted in a plunge into the meter casing and a leg injury. Recovery was denied on the grounds that the city had properly installed the meter and was not required to constantly inspect or guard against tampering with the meter cover, and further that no evidence had been presented that the city had any knowledge or notice that the cover had become improperly fastened.[45]

What do these cases mean to the SAWS manager? Most pumps will be located outside the dwelling but on private property. (In the Baltimore case the meter was in a public walkway). The fact that water meters are located within the home has made the plaintiff's case more difficult since the inference is that there is more opportunity for the plaintiff's (or a guest's) negligence to play a role. To some extent this would be mitigated by locating the pump outside the house although that homeowners can do plenty of things to their property and grounds which may affect the pump. In general, it is likely that where damages occur as a result of pump malfunctions, the plaintiff will have to show the SAWS authority negligent. Here is where "preventive maintenance" may be valuable. If feasible, an inspection program should be carried out for these pumps in order to prevent problems from occurring or to show evidence of "due care" if problems do arise. The type of failure is also an important factor. A townwide electrical failure may be totally beyond the SAWS authority control (is backup generation feasible?) in which case liability may not arise. However as a matter of public relations and economics, legal obligations may differ from other obligations. If a number of dwellings are affected by flooding it may be less expensive for the SAWS authority to arrange for cleanup for all affected customers.

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[41] 20 American Law Reports 3rd 1380.

[42] Ibid, p. 1379-1381.

[43] Imperial Candy Co. v. Seattle 93 Wash 145, 160 p. 303.

[44] Metevia v. Athos, 348 Mass. 274, 203 NE2d 382.

[45] Harrison v. Baltimore 247 Md. 583, 234 A2d 135.

When a centralized SAWS is established an evaluation of existing on-site disposal systems is usually carried out. In many instances an existing septic system may be judged adequate for use in the new central system. What happens if the septic system or existing outlet pipe malfunctions, causing damages? In general the rule on liability for sewers constructed by third parties is that:

> ...there is no municipal liability for sewers...constructed by third persons for their own use and not controlled by the municipality. The mere fact that a city had bolted down and sealed the holes of a manhole in a private drainage system, and regularly sent an employee to see that it was open, does not constitute municipal adoption and control of such private drainage system. But if sewers...constructed by third persons are in some legal manner adopted by the municipality as a part of its sewerage or drainage system or the municipality, assumes control and management thereof, the municipality becomes liable...since in such cases it is immaterial by whom the sewer...was constructed.[46]

This doctrine applies where, for instance, a town adopts a subdivision drainage system constructed by a developer.[47] Clearly, if the SAWS authority adopts septic tanks as part of its system it is assuming liability. But what if the SAWS authority is only approving the application after an inspection of a property owner to hook into a central line using their existing system? In general, where only an inspection is involved and not adoption or assumption of control and management liability will probably not arise. This issue will be discussed further in the following section.

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[46] 18 McQuillan MuncCorp 53.118.

[47] Burford v. Village of LaGrange 90 111 App2d 210, 234 NE2d 120.

DECENTRALIZED SAWS

A decentralized SAWS uses on-site disposal as its method of treatment. The analogies that may be used in discussing a centralized SAWS are not present in this case. Discussion of liability must therefore be more speculative. One fact is clear.

The greater the control a SAWS authority exercises over on-site systems the greater chance it has of incurring liability. From this fact a recommendation can be derived:

Unless there is a distinct advantage in ownership or in exerting substantial controls the operation, maintenance and construction of on-site systems should be left in the hands of the property owner.

If a SAWS authority legally adopts or constructs or repairs an on-site system (though leaving ownership with the property owner) liability becomes a distinct possibility although negligence will still have to be proved in the event of a suit. Where the line establishing liability is drawn is unclear. Since there is little case law, on point decisions may vary to a great degree once these issues are presented to the courts. An illustration of how tough these issues are to decide can be seen in a case from Hawaii.[48] Mrs. Carter owned an apartment building across the street from county park. The park storm drain system drained into Mrs. Carter's privately built drain system. On three occasions heavy rainstorms had led to flooding and ruptures of Mrs. Carter's drains. After the first two instances the county had repaired the drains. After the third time the county refused to do anything. Mrs. Carter sued the county with one theory of recovery being that the county had adopted the drain as part of a public drainage system by assuming liability on the two prior occasions. The Court declined to agree ruling that "At most, what we have here amounts to little more than the casual making of repairs to a private drain by a municipality, and that is not sufficient to constitute an adoption."[49] In other words the county was just being a nice guy earlier.

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[48] Carter v. County of Hawaii, 384 P2d 308.

If the SAWS authority limits itself to inspection of construction and repairs of on-site systems and periodic inspections of the overall condition of the system, what liability will arise from negligent approval of faulty plans or failure to spot an obvious problem during a routine inspection?

The issue of municipal liability in relation to inspections has most often arisen in cases of building inspection, approval of building plans and issuance of certificates of occupancy. There is almost no case law on septic systems specifically.[50]

Historically, courts have been loathe to find municipalities liable for faulty building inspections on the grounds that the 1) usual purpose of the inspection is to provide a service to the general public and not to the specific owner of the inspected building (the "public duty" doctrine) and that, 2) it is beyond the capability of inspectors to obligate them to fulfill a role as a guarantor of the quality of individual properties. A Washington court summed up the latter point in a decision stating that

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[49] Ibid, p. 314.

[50] One exception is a Massachusetts case, McDonough v. Whalen 313 NE2d 435. The McDonough's had bought a home from a builder. The builder had employed the town health agent (Whalen) to design the septic system. After installation the agent inspected and certified compliance with board regulations. The system never did function properly and eventually the builder repurchased the home from the McDonough's. The McDonough's sued the health agent and the installer. Whalen claimed immunity. The court found that when he designed the system Whalen was acting in a private capacity and was liable to suit. The court did not reach the question of whether Whalen was liable for his actions in inspecting the system as town health agent.

> We agree...that the city owed no duty to appellant individually in issuing the building permit or in inspecting the ...building. To hold otherwise would cause the city to become a guarantor of each and every construction project--a task not only beyond the scope of the building code as enacted, but also one that the city is incapable of performing.[51]

While the Washington Court seemed to say liability would not be found because of the inability of the inspectors to perform their duties fully and still meet the demands of their job, New Jersey had declined to hold a municipality liable for the opposite reasons.[52] A construction company had built a home for Mr.and Mrs. Fiduccia for which the municipality had issued a certificate of occupancy. The Fiduccia's claimed that the builder had failed to construct the home properly. The court noted that the certificate of occupany was issued for the protection of the municipality as a whole, not for the benefit of the landowner. Furthermore, because the issuance of a certificate of occupany was found to require considerable skill and expert judgment on the part of the building inspector, the court found the activity to be discretionary in nature and dismissed the complaint.

Following this reasoning most courts[53] reach the same conclusion even where death or injuries resulted.[54] Recently however, some courts have begun to strike down the public duty defense and rule that municipalities are liable for negligent inspections. Alaska and Iowa have taken the lead on this issue.[55]

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[51] Georges v. Tudor 556 P2d 564.

[52] Fiduccia v. Summit Hill Construction Co. 109 N.J. Super 249, 262 A2d 920.

[53] For an exception see Sexstone v. City of Rochester, 32 App. Div. 2d 737, 301 NYS2d 887.

[54] See Modlin v. Miami Beach 201 So. 2d 70, Tyler v. Ingram 139 Tex 600, 164 SW2d 516.

[55] Adams v. Alaska 555 P2d 235, Wilson v. Nepstad 282 NW2a NW2d 664; see also "Municipal Liability for Negligent Building Inspections. Demise of the Public Duty Doctrine?" Iowa Law Review 65:1416-44 July 1980.

Despite the Alaska and Iowa decisions it is likely that in most other jurisdictions a SAWS authority will not be liable for negligence in approval of construction plans or in carrying out inspections. It should be pointed out that if a system is improperly designed or repaired, then the property owner will have a cause of action against the private contractor. One caveat on this matter must be stated. It cannot be stressed too often that the general trend is for courts to erode away municipal immunities. Even if at the time of SAWS creation immunity may apply for an activity, court decisions should be carefully monitored so that if changes do occur SAWS management can revise its methods of operation.

MUNICIPAL LIABILITY FOR ACTIONS OF CONTRACTORS

In most cases the SAWS agency will hire a contractor to construct or rehabilitate collection or onsite systems to be owned by the SAWS. The SAWS agency may also contract for on-site system inspection and pumping. When evaluating these aspects the SAWS planner should consider:

- Liability for contractor actions
- Obtaining adequate insurance coverage

Liability

Generally municipal corporations are not liable for the acts of an independent contractor.[56] However, this general rule is subject to so many exceptions in different jurisdictions that the law in your area should be carefully examined along with state municipal tort liability statutes.

One major exception, is that where control of the work is reserved by the municipality it is liable for the torts of an independent contractor. Usually mere supervision and inspection of the work to ensure contract compliance does not make the municipality responsible. The more involved the municipality becomes in the "complete supervision over the manner of doing the work in detail"[57][McQuillan, MuncCorp 53.76a] the greater the likelihood of incurring liability.

An illustrative case of particular interest to SAWS planners arose in Mississippi.[58] The municipality let a contract for removal of garbage and cleaning of cesspools. An incident occurred and both the contractor and municipality were sued. The court held that the municipality was not liable since the contractor was doing the work for the benefit of the owner or occupier of the house under the local ordinance.

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[56] McQuillan, MuncCorp 53.75a

Insurance

As discussed earlier, a SAWS agency should first examine state law to determine what effect insurance coverage will have on its own liability. The contractor's insurance program should then be examined by the SAWS agency to determine the extent and nature of three types of coverage.

- Workmen's compensation and employer's liability insurance
- General liability insurance
- Professional (errors and omissions) liability insurance

An evaluation of insurance coverages and the bargaining position of the parties will decide whether some "shifting of the risk" is appropriate or whether, if both parties have liability insurance, the economics of the situation require that liability be let fall where it may.[59]

SUMMARY

Three SAWS management questions have a number of legal aspects. The questions are: Should the SAWS agency own the treatment equipment? How can the agency obtain access to private property for inspections or construction work? And what is the agency's liability for its activities? This section has outlined the general legal issues that SAWS planners should keep in mind when addressing these questions. These general legal principles do not supply specific answers for SAWS planners. To make decisions about ownership, access and to plan for liability, SAWS planners must also consider the economic, political, public relations aspects of these issues. To these considerations, they should also add any specific state and local legal constraints or requirements.

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[58] Gulfport v. Shepherd 116 Miss 439, 77 So 193.

[59] For a more complete discussion of these issues see Charles F. Bachmann, "Shifting Risks Through Insurance and Hold Harmless Agreements" Insurance Counsel Journal, October, 1961, Vol. 28, p. 617. A case illustrating the importance of careful drafting of these clauses is Shea v. Bay State Gas Company, 1981 Mass. Adv. Sh 765, NE2d.

PARTICIPATION

INTRODUCTION

"Participation" as used in this paper refers to those decisions by SAWS planners of what residential and commercial units in a municipality are to be included in a SAWS program. This decision should be made in conjunction with the delineation of service area (see SAWS Planning Methodology). This issue will be discussed in three sections.

- Considerations in deciding inclusion
- Legal approaches towards implementing a participation program
- Public education and involvement activities to encourage voluntary participation

PARTICIPATION OF EXISTING ON-SITE SYSTEMS

The SAWS Planning Methodology paper discusses the most prominent considerations for SAWS planners in deciding the extent of participation. The points are listed below.

- Attitudes towards public management
- Administrative concerns
- Economies of scale
- Financial considerations
- Potential facility risk
- Sensitivity of water resources

In addition to these considerations the issue of distinctions among classes of potential system users must also be analyzed. This issue is of particular importance where an individual on-site SAWS is planned or where a mixed technology system (collection and on-site) is the preferable alternative. In this situation a determination must be made as to whether the purpose of the SAWS is preventive and/or corrective. A corrective situation implies that there are problems with existing on-site systems necessitating inclusion of, at a minimum, these "problem" systems. A preventative SAWS program allows the planners to determine whether existing on-site systems may be "grandfathered" (made exempt by ordinance) or to provide for a phased inclusion of on-site systems into the program. This would enable the management agency to concentrate on regulating and integrating new on-site systems into a SAWS program.

IMPLEMENTING A PARTICIPATION PROGRAM

What legal tools does a SAWS authority have available to it to effectively initiate a management program? Generally a SAWS program will involve a centralized or decentralized system or a mixture of such systems. If it is decided that a centralized system is to be constructed (for example, pressure or vacuum sewers), can the SAWS authority require uniform participation or must it make any findings regarding specific on-site systems first?

Traditionally a municipality may by ordinance condemn and abolish all private waste disposal systems and require connections into a sewer system.[1] It is usually not necessary that a finding be made that a party's private system is inadequate although Michigan courts have held the contrary.[2] Such an ordinance is not invalid as imposing too great an expense, since it is expected that the owner will bear a fair proportion of government expense and contribute to the maintenance of the community health.[3] Similarly, municipalities have been given wide latitude in regulating individual on-site disposal systems.

> It is generally within the express power of municipal corporations or boards of health or considered to be within their police power or within their power to abate nuisances for them to adopt suitable measures and take appropriate action with respect to...cesspools and septic tanks. Without doubt...cesspools and septic tanks...may by reason of location, defective construction, inadequate maintenance...or improper use, constitute health menaces and

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[1] Nokomis v. Sullivan, 14 1112d 417, 153 NE2d 48.

[2] Butcher v. Grosse 1le 387 Mich. 42, 194 NW2d 845

[3] People v. Butcher, 209 NYS 2d 723, People v. Smith, 21 1112d 572, 173 NE2d 485.

> consequently public nuisances subject to summary abatement. The time and manner of cleaning and removal of the contents...may be regulated by municipal corporations.[4]

A recent Illinois case[5] illustrates many of these points. A village brought an action to recover a fine for the defendent's failure to connect with the municipal sewer system as directed by a local ordinance. One of the grounds on which the defendent contested the claim was that the municipality cannot declare something to be a nuisance which in fact is not. After finding that state statutes gave the municipality such authority the court discussed the municipal common law power.

> A municipality...has the authority to regulate as a nuisance anything in which there could be an honest difference of opinion, if, in the municipality's opinion, such item constitutes a nuisance. In addition...where it is questionable whether or not something is a nuisance, the municipality's decision will be conclusive unless its judgment and discretion is clearly erroneous.[6]

FROM WHERE DOES MUNICIPAL AUTHORITY DERIVE?

To carry out a regulatory program for SAWS management a SAWS authority may derive its governmental powers from a number of sources.

- Statutes authorizing on-site wastewater disposal zones
- Special legislation
- State enabling statutes or regulations including sanitary and subdivision codes
- Home rule authority/police powers

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[4] McQuillan, Municipal Corporation 24.263

[5] Village of Riverwoods v. Untermeyer 54 111 App 3d 816, 369 NE2d 1385.

[6] Ibid. p. 1390.

On-Site Disposal Zone Acts

Several states have enacted legislation allowing municipalities to establish wastewater disposal zones within which innovative and alternative wastewater control techniques can be employed. The Illinois Wastewater Disposal Zone Act allows zones to be established

> to acquire, design, own, control, install, operate, monitor, regulate, inspect, rehabilitate, modify and maintain existing and new on-site waste disposal systems[7].

The Act sets out detailed procedures which a community must follow in order to create such a zone. The California On-Site Wastewater Disposal Zone Act has similar provisions.[8]

By operating under the umbrella of acts such as these the SAWS authority gains a clear legal mandate. The Authority may utilize only those powers it needs from the broad range of potential activities allowed by the Act. Without authorizing legislation such as this, a SAWS authority may have to piece together programs from several different sources which can lead to administrative difficulties and legal complications.

Special Legislation

In some states it is possible to have legislation "tailor made" for your community. Special legislation or a special act is a statute applying to only one governmental unit in a state. For instance in Massachusetts sewer districts are commonly established by the legislature. Although the general form of a sewer district statute remains the same from act to act there are often clauses inserted reflecting specific conditions in the concerned district. Consultation with an attorney familiar with your state law is necessary before considering this route since special acts are prohibited in some states because of state constitutional doctrine.

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[7] Ibid, Sec. 3(b)

[8] Chapter 1125 of 1977.

State Enabling Statutes

State legislation in the areas of sanitation and subdivisions regulations may grant optional authority to a municipality, county or special district which can be used to implement part of a SAWS program.

Sanitary Codes

State sanitary codes or board of health regulations often set out minimum standards which local or county boards of health must follow in inspecting and permitting on-site disposal systems. Many codes allow local boards to enforce their own regulations as long as they are as strict or stricter than the state codes.[9] Some state codes explicitly describe optional types of regulations that may be adopted. For example the Colorado state board of Health guidelines state that:

> the local board of health may adopt rules and regulations for the scheduling of maintenance and cleaning of systems and practices adequate to insure proper functioning of acceptable systems, and may require proof of proper maintenance and cleaning, pursuant to any such schedule and practices to be submitted periodically to the local department of health by the owner of the system.[10]

Through both code authority and the general police power local governmental units have leeway to establish on-site disposal system monitoring, pumping and inspection programs.

Subdivisions

Subdivision control laws enable local and county governments to enact regulations setting standards for new developments within their jurisdictions. In approving subdivision plans, local agencies may require developers to insert covenants in property deeds or to "dedicate" certain facilities to the local government. A number of jurisdictions in Michigan have already or are contemplating the use of covenants for septic system maintenance purposes.[11] These covenants cover the types of items listed below.

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[9] For instance, see Massachusetts Sanitary Code, Title 5.

[10] Guidelines on Individual Sewage Disposal Systems, May 16, 1979, Section IV M.3

- Inspection by property owners associations
- Pumping
- Reports to local boards of health.[12]

These covenants are recorded in public land records and are enforceable via law suits if they are violated.

Home Rule Powers

Historically, municipalities and counties were considered creations of the state and could only exercise those powers explicitly granted to them by the state legislature. Recently, however, a number of state constitutions have been amended to allow for county or municipal "home rule". Home rule completely reverses the old concept of municipal legislative authority. The typical Home Rule Amendment allows the local government to exercise powers as long as it is not inconsistent with any previously enacted state legislation. A typical amendment of this type is the Massachusetts Home Rule Amendment which states that:

> ...any city or town may, by the adoption, amendment, or repeal of local ordinances or by-laws exercise any power or function which the general court (state legislature) has the power to confer upon it, which is not inconsistent with the constitution or laws enacted by the general court...and which is not deemed, either expressly or by clear implication, to the city or town by its chapter.[13]

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[11] Michigan Subdivision Control Act (Act 283, P.A. of 1967)

[12] For more details see, Institutional Alternatives for Septic System Maintenance Districts in Southeast Michigan, by Lillian F. Dean, September 1980.

[13] Art. 2 6 as amended by Art. 89 of the Amendments.

In Massachusetts, courts have upheld local ordinances enacted under this amendment regulating development in wetlands.[14]

Iowa has adopted home rule amendments for both its counties and municipalities.[15] An Iowa court has upheld County Board of Health regulations requiring a minimum of a 5 acre tract for septic systems on the grounds that the County Home Rule Amendment had conferred such authority upon the county.[16]

If your community is in a Home Rule state it would be useful to analyze the Home Rule amendment and related court decisions to determine whether parts of a SAWS management program could be enacted under its provisions.

PUBLIC EDUCATION TOOLS

Concurrent with the drafting of the legal requirements for mandatory participation in a SAWS management program, SAWS planners should initiate a public education program. According to the EPA Municipal Wastewater Management Public Involvement Activities Guide,[17] the purpose of a public education program is fivefold:

- To generate public interest in SAWS management
- To increase the public understanding of the water quality, economic and administrative reasons for SAWS management
- To provide public access to planning documents and other information

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[14] Lovequist v. Conservation Comm. of Town of Dennis, 393 NE2d 858.

[15] Iowa Constitution Art III, Sec. 38A & 39A.

[16] Kasparek v. Johnson County Board of Health 288 NW2d 511.

[17] Municipal Wastewater Management: Public Involvement Activities Guide, U.S. Environmental Protection Agency, Office of Water Program Operations, January 1979.

- To publicize public participation opportunities
- To elicit public reaction to SAWS management alternatives

In developing a public education program to increase public acceptance of SAWS management, planners must be aware of their public. What are the citizens' concerns about SAWS management? What are the best tools to address those concerns, and to generate public support for SAWS management?

There are a number of public education tools available to SAWS planners. The following list summarizes the public participation tools chapter in the EPA Public Involvement Activities Guide. For more detail on the design and implmentation of a public education program, see pages 62 to 85 in the EPA Guide.

Public Education and Information Activities

Newspaper articles
Radio and TV programs
Speeches and presentations
Field trips
Exhibits
School programs
Films
Brochures
Newsletters
Reports
Letters
Conferences

Education and information activities can familiarize the public with the water quality problems SAWS management will prevent and/or correct. These tools are also an excellent way to distribute information in nontechnical language on the relative costs and benefits of SAWS management.

Public Review and Interaction Techiques

Public Hearings
Survey Questionnaires
Public Inquiries
Public Meetings
Workshops

Special Task Forces
Interviews
Advisory Boards
Informal Contacts
Study Group Discussions
Seminars

Public review and interaction techiques fall into two categories. One category of activities, termed reactive, simply solicits public reaction to planning agency decisions. The other groups allows the planners to respond to questions posed by the public. The second group is called interactive activities. The two-way communication established by interactive activities keeps planners aware of public concerns. Awareness of public concerns helps planners in two ways: they can design publicly acceptable SAWS management programs, and can mount extensive education efforts to overcome problems.

SUMMARY

To detemine which systems should participate in a SAWS management program, SAWS planners must consider public attitudes, administrative issues, economics and water quality issues. Once the service area and the type of systems in the program have been defined, planners must outline the available legal means for involving the selected systems in the management program. The legal authority to require participation, combined with an active public education program, gives SAWS planners the means to initiate management programs.

ESTIMATING SAWS MANAGEMENT COSTS

INTRODUCTION

Although often the least costly method of achieving wastewater quality objectives, SAWS management is not free. It costs money to have a public employee review plans, inspect installations and enforce mandatory maintenance requirements. In selecting and financing a wastewater management program, the agency must perform three tasks.

- Estimate the annual costs (so that the least costly alternative can be selected).
- Acquire cost sharing funds (grants or low interest loans) to reduce the costs to the users.
- Develop a plan for collecting the necessary funds from the users.

This Issue Paper will focus on the first of these tasks while the following paper, "Finances: Financing Options for SAWS Programs" will address the second and third. It is important to remember that all planning generally occures in an interative fashion, and that the division between these two papers is somewhat artificial. However, the general procedure requires that the total capital and managment cost for any alternatives be determined as the first step, which is why we start with this topic.

CATEGORIES OF COST

SAWS systems may or may not require considerable initial capital expenditures to be financed by the SAWS Agency. However, there are almost always considerable management costs to be covered. The types of costs typically incurred by a SAWS Agnecy are summarized in Exhibit 1. Before cost estimates can be made, responsibility for each of the costs must be assigned to either the SAWS Agency or the private property owner.

Exhibit 2 is a simple checklist of typical capital and operation and maintenance costs that can be incurred in SAWS management programs. The delegation of responsibility between the SAWS Agency and the homeowner for these major cost items is noted to illustrate the possible cost-sharing arrangements that might exist in a SAWS program. The two example SAWS programs, an on-site management program and a small community systems

EXHIBIT 1

TYPES OF COSTS TYPICALLY INCURRED BY SAWS MANAGEMENT AGENCIES

Type of Cost	Description
CAPITAL COSTS	
Initial Construction:	Capital investments in plant and equipment made at the outset of the project for sewers, septic tanks, POTWs, residuals handling facilities, and vehicles.
Excess Capacity:	That portion of the initial Capital Costs which is justified in anticipation of future demand.
Future Construction:	Capital investments made in the future to serve new development.
Replacement:	Capital investments required periodically in the future to replace original plant and equipment.
OPERATING COSTS	
Start up Administrative Costs:	Costs incurred during the planning and construction phase: legal cost of creating a wastewater management agency, hiring staff, developing by-laws, acquiring loans, issuing bonds.
Ongoing Administrative Costs:	Record keeping, billing, issuing permits, inspection of installations, enforcement actions, and groundwater monitoring.
Operation and Maintenance:	Labor, energy, materials and supplies, services.

EXHIBIT 2

Responsibility for Management Costs

Typical Costs	On-Site Mgmt.		Small Community Mgmt.	
	SAWS Agency	Homeowner	SAWS Agency	Homeowner
CAPITAL COSTS				
Initial Construction				
o Sewer lines			X	
o Septic tanks		X		
o Pumping units			X	
o Treatment facilities			X	
o Land			X	
Excess Capacity			X	
Future Construction		X		X
Replacement		X	X	
OPERATING COSTS				
Start up Administration	X		X	
Ongoing Administration	X		X	
O&M				
o New installations		X	X	
o Routine maintenance	X		X	
o Repair/replacement		X	X	
o Residuals disposal		X	X	
o Monitoring	X		X	

(pressure collection sewers-treatment plant) program illustrate alternative cost assignments and agency/homeowner responsibilities in Exhibit 2.

CAPITAL COSTS

Initial Construction

Most technical alternatives have an associated initial capital cost. While, in many cases the property owners will bear the full responsiblity for initial construction costs, it is also common for the SAWS agency to take on considerable start up expenses. Design engineers have experience in developing construction costs estimates, and should be able to provide the SAWS agency with resonable information for decision making. However, it is important for the community to carefully review the assumptions made regarding the number of systems to be replaced, upgraded, or rehabed, to insure that they are realistic. Exhibit 3 provides a format for calculating the initial construction costs.

Excess Capacity

Excess capacity is a concept more closely associated with conventional wastewater technologies. But it also applies to several SAWS technologies. When a community septic system with small diameter sewers is installed to serve a small downtown area, should it have excess capacity to accommodate new development? If so, who pays for that additional cost? Is it shared only by the current users of the system or by the communtiy at large? Excess capacity costs are generally included in the initial construction costs estimate, and are only considered separately here because of their impact on the how funds are collected to pay for the system.

Future Construction

If the community relies totally or partially on on-site wastewater systems, new systems will be built to serve new development. Or as with the case above, new connections may be made to an existing community system. There will be an initial capital cost associated with the provision of wastewater services to these new users. In general communities allocate responsibility for all of the capital costs for new construction to the property owner. However, there have been exceptions, and any anticipated SAWS agency cost must be estimated.

EXHIBIT 3

Procedure for Calculating Initial Construction Costs

Typical Item	Description and Assumptions	Cost Calculation
Collection Lines	Linear feet of sewer line and installation cost, adjusted by physical characteristics and wage rates.	Cost/foot x number of feet of line
Septic Tanks	Number of tanks plus miscellaneous materials for drainfield/disposal areas. Determine type of tank and equipment specifications.	Number of tanks required by type
Pumping Units	Number of pumps and associated equipment. Evaluate alternative types of pumping units (e.g., grinder or STEP) and manufacturer specifications. Also assess feasibility of sharing units among several homes versus one pump/home.	Number of pumping units required by type
Treatment Facilities	Treatment plants and disposal facilities for wastewater and septage (residuals) treatment are necessary. Review available published cost curves for preliminary cost estimates of alternative processes.	Type of treatment/disposal facility desired
Land	Land for treatment/disposal facilities and easements might also be necessary. Investigate full purchase, easements purchase and leasing as options.	Cost of land with appropriate purchase assumptions

Replacement

All equipment eventually wears out and will have to be replaced. Because SAWS technologies rely heavily on a large number of decentralized facilities, the cost of phased replacement is often an issue. Will the property owner or the SAWS Agency pay for replacement? If the SAWS Agency pays, this cost must be estimated.

Estimating the future failure rate of on-site systems or pumps and appurtenances for small community systems can be a difficult and elusive task. A common procedure used to estimate the failure rate of on-site systems is to extrapolate the past failure rate. A refinement of this method is to adjust the rate for the age distribution of septic systems in the service area.

In small community system programs, the failure rate for purposes of equipment replacement is usually determined on a trial and error basis during the first few years of program operation. The typical procedure is for the SAWS Agency to maintain a supply of replacement parts to ensure that proper back-up units are available.

OPERATING COSTS

Operating costs include the labor and materials required for the SAWS agency to perform its alloted tasks. Exhibit 4[1] provides a sample format for determining the staffing needs of the SAWS Agency depending on the services to be provided. Exhibit 5 is a working table used to calculate actual staffing requirements. Exhibit 6 is a summary worksheet for calculating total annual operating costs for both labor and nonlabor components. To make sure that all operating costs are included it is useful to review types of expenditures as well as individual functions.

Start up Administrative

When a community initiates a new wastewater management program there are start up administrative costs, similar to initial construction costs. This general category of costs would cover most of the planning required to select and design a management alternative. In addition

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[1] Note that exhibits 4 through 9 are from Management of On-Site and Small Community Wastewater Systems - Guide for Developing Institutional Arrangement for the Management of Small Wastewater Systems. EPA MERL, November 1981, Contract No. 68-03-2753, Roy R. Weston, Inc.

EXHIBIT 4 CALCULATION OF MANAGEMENT AGENCY STAFF

Management Activity Description	Implementing Agency	Calculations and Assumptions	Annual Workday Requirement by Staff Type
New Installations Site evaluations Design review Permit issuance Installation supervision	County health department to issue permits and inspect installations. Sewer authority staff will assist in installation supervision. Private contractor and property owner conduct site evaluation and prepare designs.	**On-Site Systems** Four new septic systems built each year for 20 years. Four new systems x 1 day/system = 4 working days/year for the sewer authority.	4 (1)
		Cluster System No additional connections assumed.	
System Maintenance Periodic inspections Service calls Customer relations Violation notices Permit renewal Recordkeeping	Sewer authority will maintain systems. County health department will issue violation notice based on sewer authority referral. Mandatory maintenance permit approach would be used (with inspections) for on-site systems.	**On-Site Systems** Inspect every three years. $\frac{400 \text{ systems}}{3 \text{ years}}$ = 133 systems/year Assume inspection rate of three systems per day to schedule, inspect, and report findings. $\frac{133 \text{ systems}}{3}$ = 45 days/year	45 (1)
		Cluster System Biennial inspections of pump units. $\frac{50 \text{ units}}{2 \text{ years}}$ = 25 units/year Assume inspection rate of two units per day to schedule, inpect, and report findings. $\frac{25 \text{ units}}{2}$ = 13 days/year	13 (1)
System Maintenance (continued)		**Treatment and Disposal Systems** Routine visits, at least twice a week per system (there are two systems). Assume 1 day/week for routine visits and inspections.	52 (1)
System Repair/Rehabilitation Failed system inspections Repair supervision Violation notices	County health department will regulate septic system repairs with sewer authority coordination and supervision of installation.	**On-Site Systems** Six failed systems/year. Each system investigation and follow-up will take one day.	6 (1)
		Cluster System Failing pump units and other equipment are taken care of as part of routine maintenance activities.	

EXHIBIT 4 (Continued)

Management Activity Description	Implementing Agency	Calculations and Assumptions	Annual Workday Requirement by Staff Type
Residuals Disposal Septage pumping Septage disposal	Private haulers contracted by property owners for individual systems and STEP units. Sewer authority to contract haulers for cluster system (holding tank). Sewer authority to administer and manifest system for private haulers.	Direct manpower limited to manifest system administration. Private haulers to pump holding tanks. Assume cluster system treatment units to be pumped once every year at $100/event; therefore, annual cost of $100 for septage pumping for the cluster unit (see Table 11).	15 (1)
Monitoring Surface-water quality Groundwater quality Special systems monitoring	Sewer authority will sample water quality and state agency will analyze samples taken.	Quarterly sampling at 12 sampling points. Assume 1 day/quarter to sample.	4 (1)
Administration Financial management Office administration Special consulting Compliance reporting	Sewer authority will employ part-time administrator for at least first 2 to 3 years of of operation. Part-time clerical assistance is also necessary.	Assume 0.5 day/week for manager. Assume clerical assistance at two days/week.	26 (2) 104 (3)

Total Workday Requirements:

(1) Technician/inspector - 139 workdays/year
(2) Program administrator - 26 workdays/year
(3) Clerical - 104 workdays/year
Total Workdays/Year - 269 (This represents slightly more than one work-year of effort)

EXHIBIT 5. ESTIMATING PROGRAM STAFF REQUIREMENTS

Function	Implementing Entity[1]	Assumptions and Calculations[2]	Annual Work Day Requirements[3]
New Installations			
• Site evaluation			
• Design review			
• Installation supervision			
• Permit issuance			
System Maintenance			
• Routine maintenance (inspections)			
• Emergency maintenance (service calls)			
• Customer relations			
• Permit renewals		SAMPLE FORMAT	
System Repair/Replacement			
• Failed system inspection			
• Installation supervision/ performance			
• Violation notices			
• Permit renewals			
Residuals Disposal			
• Pumping			
• Treatment and disposal			
Monitoring			
• Surface-water quality			
• Groundwater quality			
• Wastewater discharge			
• Special systems monitoring			
Administration/Planning/Financing			
• Office administration			
• Compliance reporting			
• Financial management			
• Bookkeeping			
• Billing and accounting			
• Public relations/education			
• Program coordination			
• Maintenance recordkeeping			

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[1] As identified in the operations plan.

[2] Determine frequency and number of visits and time involved in performing various functions.

[3] Indicate staff category, e.g., managerial, technical, clerical (see Table 51).

EXHIBIT 6 CALCULATION OF OPERATING COSTS

	(A) Annual Salary	(B) Adjusted Salary[1]	
Labor			
Program manager	$		
Assistant manager	$		
Professional staff	$		
Field crews, technicians, operators	$		
Clerical/bookkeeping staff	$		
Total salary costs (from column B)		$__________	
Insurance and benefits (___% of total salary costs)		$__________	
Total labor costs			$
Nonlabor			
Treatment system	$		
Utilities, chemicals, etc.	$		
Vehicle maintenance	$		
Miscellaneous equipment, tools, etc.	$		
Replacement parts, etc.	$		
Treatment service charges	$		
Residuals disposal charges	$		
Private contractor service charges	$		
Testing equipment	$	SAMPLE FORMAT	
Laboratory analysis	$		
Office expenses (rent, postage, supplies, utilities, etc.)	$		
Staff training	$		
Training courses, seminars, etc.	$		
Consultant services	$		
Legal/accountant services	$		
Taxes	$		
Insurance (on equipment)	$		
Miscellaneous expense (e.g., mileage)	$__________		
Total nonlabor costs			$
Total operating costs			$

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[1] Adjusted salary (column B) = average annual salary (column A)

$$\times \frac{\text{total man-days required}}{\text{total man-days in one man-year}} \text{ (Table 50)}$$

this category would cover the costs of aquiring the staff to run the program and provide them with the basic data they need to operate the management program. For example, if a community plans to manage on-site systems more closely, it is often necessary to start by developing a good inventory of the the systems, setting up files and conducting field inspections. Also, application, billing and filing procedures must be developed.

Start up administrative costs may be estimated separately and paid for under a separate allocation for planning, or they may be include in the annual O&M budget for the first year or two. In either case it is important to have sufficient funds allocated to cover these costs.

Ongoing Administrative

Office administration, filing reports, budgeting, bookkeeping, maintenance recordkeeping, billing, public education, and program coordination are all ongoing administrative costs associated with a SAWS management agency.

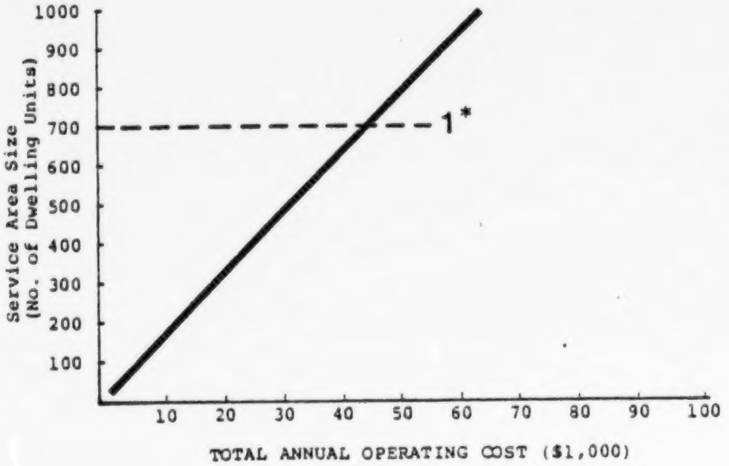
OPERATION AND MAINTENANCE

Operation and maintenance (O&M) costs include activities related to the installation of new systems, maintenance of existing systems, repair and replacement, residules disposal, and monitoring.

Sample procedures for developing these costs will be shown below.

In making O&M cost estimates it may be useful to compare figures with those of other communities. Exhibits 7 and 8 present approximations of the total program costs for on-site and small community system management programs. The exhibits display program costs according to service area size (as measured by the number of dwelling units served). The program costs were calculated using certain assumptions regarding failure rate, frequency of inspections and other important items noted on the exhibits.

These exhibits reflect O&M costs with the exception of septage pumping, as calculated in Exhibit 6. The impacts of economies of scale, as reflected through the use of a full time or part-time staff, are also taken into account in these exhibits. A more specific analysis of possible economies of scale in management approaches can be accomplished



*Number of full-time staffpersons to cover technical and administrative duties (except clerical).

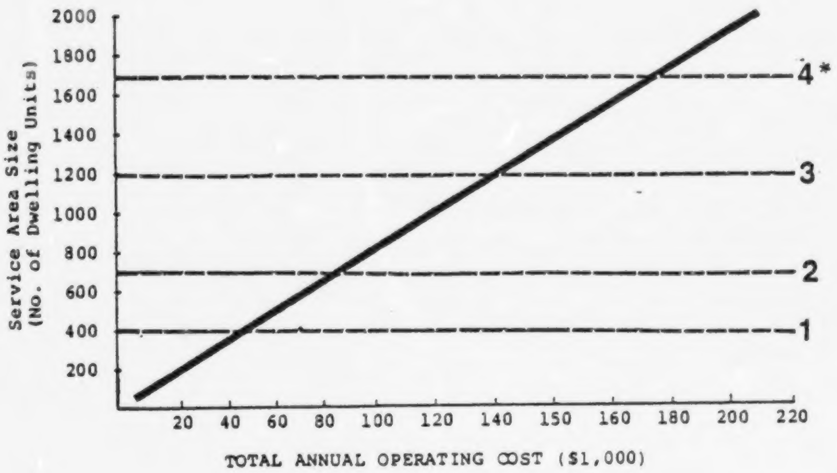
ASSUMPTIONS

Assuming individual standard septic systems on a regular maintenance program with homeowner responsible for system repairs and septic tank pumping.

1. New installations -- Slow growth rate (1% annual growth) with time devoted to design review, inspection, and permit administration.
2. Operation and maintenance -- Septic systems inspected once every three years at one-half workday per inspection. Two percent annual failure rate assumed. Time for design review, inspection, and permit administration for repair systems is included.
3. Septage disposal -- Average tank pumping frequency is once every five years. Pumping costs are not incorporated into the estimates. Administration of recordkeeping program is included.
4. Monitoring -- Quarterly sampling program is assumed for surface and groundwater quality analysis.
5. Staffing -- Technician salary is $45/workday ($12,000/work year), manager's salary is $70/workday ($18,000/work year), clerical salary is $35/workday ($9,000/work year). All salaries include fringe benefits.
6. Nonlabor costs -- Total nonlabor cost (e.g., office space, utilities, vehicle costs, supplies, etc.) is equal to labor costs.
7. Operating cost -- This does not include debt service for initial system rehabilitation, or the cost of future system repairs.

The cost curve is intended to illustrate the general relationship between operating costs and service area size. The information derived can be used to calculate order of magnitude preliminary operating cost estimates. This information, however, is not intended to serve as a substitute for the more detailed cost-estimating procedure presented in Tables 49, 50, and 51.

EXHIBIT 7 Typical relationship between operating cost and service area size for conventional on-site systems.



*Number of full-time staffpersons to cover technical and administrative duties (except clerical).

ASSUMPTIONS

Assuming small diameter pressure sewer system with individual grinder pumps (one pumping unit per household), and aerated lagoon treatment facility with surface discharge.

1. New installations -- Slow-moderate growth rate (3% annual) for future connections.
2. Operation/maintenance -- Each pump unit inspected once every two years for preventive maintenance and service at one-half workday per inspection. Collection line and treatment facility maintenance also included. Maintenance costs were adjusted by facility and service area size.
3. Staffing -- Technician (plant operator/inspector) salary of $55/workday ($14,400/work year), manager at $70/workday ($18,000/work year), and clerical at $35/workday ($9,000/work year), including fringe benefits.
4. Nonlabor costs -- Costs for office expenses, vehicle costs, and equipment are one and one-half times the labor costs.
5. Operating costs -- This does not include debt service for initial capital improvements, pump replacement costs, and cost of purchasing and installing pump units for future connections.

The cost curve is intended to illustrate the general relationship between operating costs and service area size. The information derived can be used to calculate order of magnitude preliminary operating cost estimates. This information, however, is not intended to serve as a substitute for the more detailed cost-estimating procedure presented in Tables 49, 50, and 51.

EXHIBIT 8 Typical relationship between operating costs and service area size for small community systems

through the detailed manpower/functional analysis shown in Exhibits 4 and 5. By utilizing these tables, a closer approximation of the actual staff requirements can be derived. Cost data that appear on Exhibits 7 and 8 are approximations, and are included to serve as a general guide for comparing gross program costs.

SUMMARY

Financial analysis is an extremely important aspect of all SAWS management planning. The first step of a financial analysis is to estimate the total annual cost of each management alternative. It is important to include all capital and all operating expenses in the total annual cost calculation.

FINANCING OPTIONS FOR SAWS MANAGEMENT PROGRAMS

INTRODUCTION

As illustrated in the previous working paper, "Cost Estimating for SAWS Management Programs," even the simplest SAWS management alternatives cost something. As a result, all SAWS agencies must raise funds to meet their water quality objectives. This paper will focus on the financing options for both initial and ongoing costs.

It is important to remember that financial planning generally occurs in an iterative fashion, with adjustments being made to reduce costs through program modifications or to accommodate cost overruns. However, the general procedure requires first the determination of the SAWS Agency's total costs, the estimation of cost sharing funds and the development of an equitable method to gather funds to finance the local share.

AVAILABILITY OF COST SHARING FUNDS

Once the costs for each of the categories listed in Exhibit 1 of the previous section have been estimated, the SAWS Agency should investigate the availability of non-local funds. These funds generally consist of federal or state grants or loans which can be used to offset part or all of the initial capital costs. While it is generally desirable to maximize the use of such non-local funds, it should be noted that capital intensive projects, such as centralized public sewerage systems, may be favored for cost sharing grants. Also, cost sharing programs may impose conditions on the physical or financial character of the project, which could be undesirable from the local perspective. Administrative requirements and delays can also be costly.

Since the inception of the EPA Construction Grants Program, local governments have focused their attention on grant eligibility in selecting their wastewater management technologies. The 1977 Clean Water Act, with its Innovative and Alternative (I/A) technologies program and the small community set aside, recognized the unique wastewater management problems faced by small communities. In situations where large initial capital expenditures are essential, the EPA construction grant program remains the best means for reducing the local share. However, because of the limited nature of construction grants funds and the long lead times required, small communities with relatively small initial capital requirements should consider alternatives, including 100% local financing, FmHA low interest loans, HUD block grants, other Federal demonstration grants or state grants and loans.

The 1981 amendments to the Clean Water Act and the new Construction Grants Regulations (May 12, 1982) require that all applications for a Step 3 grant include a Financial Capabilty Analysis which demonstates the applicants legal, institutional, managerial and financial capability to insure adequate construction, operation and maintenance of the facilities. While adding an administrative requirement, this change in the regulations should help prevent communities from over extending themselves. Even if the SAWS Agency decides to proceed without construction grant funds the planners should carefully consider the financial capability of the community to meet the expenses. The Financial Capability Guidebook, prepared for EPA by the Government Finance Research Center and Peat, Marwick, Mitchell and Co, could prove a useful resource.

In some situtations even a community with substantial initial costs may actually be better off financing the total cost of a SAWS program. A series of work sheets developed by the state of Wyoming can be useful in determining the true cost of participating in the construction grants program when costs of meeting requirements and inflation during the planning and approval process are considered.

SOURCES OF LOCAL FUNDS

When a public agency wishes to make significant capital investments, the funds are usually borrowed by issuing bonds. The types of bonds which a SAWS Agency might issue are summarized in Exhibit 1. The state or local enabling legislation will often specify or limit the bonding capabilities of the SAWS Agency. The debt service on the bonds becomes a component of the SAWS Agency's annual budget. Alternative methods for financing initial capital

Exhibit 1

BONDING OPTIONS

Public Financing Mechanism	Definition
General Obligation Bonds	These bonds are backed by the "full faith and credit" of the issuer and are generally financed by ad valorem property taxes and/or revenues from user charges.
Revenues Bonds	In this type of bond, payments are derived strictly from charges for services provided.
Special Assessment Bonds	A special assessment bond is financed through revenues from "special benefit assessments." The assessments are based on benefits accruing to properties affected by a project.

costs, such as leasing and contracting, should be considered. Once the local share of the capital costs have been annualized, they can be combined with the annual operating costs to obtain the total annual costs for the program.

The SAWS Agency must determine the most equitable method for distributing the total annual costs among the beneficiaries of the program. The term beneficiaries is used here because in some instances residents within the jursidiction, who are not users of any of the services, pay a portion of the costs through property taxes or other assesments. These residents will be beneficiaries of improved environmental quality, even if they do not receive any direct service.

To meet its annual budget, a SAWS agency must collect funds by one or more of the following techniques:

- General Revenues
  - property taxes
  - assessments by area
  - assessments by population
- User Charges
  - assessments by type of technology
  - assessments by water used
  - fees for specific services
- Specialized Revenues
  - permit fees
  - license fees
  - fines
- Direct Purchase
  - individual responsibility for all costs

Because of their decentralized nature, SAWS frequently raise different cost distribution questions than conventional systems. Public management of privately-owned facilities, public management and ownership of facilities located on private property, and publicly mandated, privately financed O&M (of privately-owned facilites) are all typical arrangements in SAWS. Financing may be further complicated when portions of the community are served by different technologies.

Distributing the costs of a wastewater management program equitably is never easy. First a consensus must be reached on a politically acceptable definition of equity. One line of reasoning states that each wastewater generator should pay according to the quality and quantity of waste produced. Another would define rates in relation to the costs of transport and treatment. A third would claim that since the benefits of a clean environment are enjoyed equally by all, whether waste generators or not, cost should be borne by the entire community. For a given community the politically acceptable definition may be any of these extremes or anywhere in between.

SELECTING APPROPRIATE LOCAL FUNDING SOURCES

State and local laws will often limit the agencies' options with regard to funding sources. Some agencies may only raise funds by adding to the local property tax rate, while others may only issue revenue bonds. If it seems unlikely that an equitable distribution of costs can be achieved within the existing institutional constraints, efforts to modify the laws might be worthwhile. Otherwise it is usually more judicious to work within the existing institutional framework.

A checklist which can be used by SAWS managers in identifying the preferred method for financing various components of the local costs is presented in Exhibit 2. In each case the preferred method will reflect both the institutional constraints on the authority and the politically acceptable definition of equity. Thus there is no universal right answer. This checklist can be used to generate discussion within the community to insure that all issues with regard to cost distribution have been raised. For example, the checklist could be complete for the existing funding arrangements and again for proposed arrangements, thus clearly illustrating proposed changes. It is suggested that this checklist be used in an iterative manner with refinements being made as more information is gathered.

Exhibits 3 and 4 illustrate which sources of funds are often used to meet the various wastewater management costs for (1) a typical conventional POTW and (2) a SAWS authority which regulates on-site systems.

EXHIBIT 2

APPROPRIATE METHODS FOR FINANCING THE LOCAL SHARE

Administrative Costs--Startup

Property tax
Special assessment by area
Special assessment by population

Administrative Costs--Ongoing

Property tax
Special assessment by area
Special assessment by population
User charge:

--fixed
--metered water
--bedrooms
--other

General operating revenues

Initial Capital Cost

Property tax
Special assessment
User charge:

--fixed
--metered water
--bedrooms
--other

Single payment, individually financed
Single payment, municipally financed

Expansion Capital--excess capacity

Hookup fees for new connections
Property tax
Special assessment
User charge:

--fixed
--metered
--bedrooms
--other

Special contributions from developers or industry

EXHIBIT 2 (Cont'd)

Expansion Capital--future construction

Single payment, individually financed
Consumer contributions

Replacement Capital

Property tax
Special assessment
User charge:

--fixed
--metered water
--bedrooms
--other

Single payment, individually financed
Single payment, municipally financed

O&M of Plant and Equipment

Property tax
Special assessment
User charge:

--fixed
--metered water
--bedrooms
--other

Fee for each service call

Debt

General Obligation Bonds
Revenue Bonds
Special Assessment Bonds
(see Figure 4)

--metered water
--bedrooms
--other

EXHIBIT 3

MATCHING SOURCES WITH COSTS
Conventional POTW

Sources of Funding Costs	Grants and Loans	General Revenues	User Charges	Special Revenues	Direct Purchase
Administrative Startup		X			
Administrative Ongoing		X	X		
Initial Capital	X		X		
Expansion Excess Capacity Capital; New Construction	X		X		
Replacement Capital			X		
O&M			X		

EXHIBIT 4

MATCHING REVENUES WITH COSTS
EXAMPLE 2 - REGULATED ON-SITE

Sources of Funds Costs	Grants/ Loans	General Revenues	User Charges	Special Revenues	Direct Purchase
Administrative Startup		X			
Administrative Ongoing		X	X	X	
Initial Capital					X
Expansion Capital; Excess Capacity					N/A
Expansion Capital; New Construction					X
Replacement Capital					X
O&M					X
Debt					X

EXAMPLES

Big Oaks, a small resort community in an unincorporated area, has recently completed a Step I facilities plan. If the proposed plan is implemented residents within the community will be served by one of three wastewater management technologies; an existing gravity sewer to a package treatment plant, new vacuum sewers connecting to the existing sewer network and a second package treatment plant, and on-site systems.

The SAWS agency has not been able to resolve whether payments should be calculated by service area or whether everyone should pay equally. The vacuum sewer system, while much less expensive than a new gravity system, will have an annual cost for debt service and O&M of almost three times that of the existing system. This cost variation is due to many factors, primarily inflation and debt service but also lower densities in the new sewer service area. Also the SAWS agency hopes that once a sinking fund has been built up, cost for maintaining the on-site systems will drop. Exhibit 5 summarizes the average monthly bills for residents of Big Oaks under three possible charge schemes.

The first option represents the view that each service area should be independently funded while the third exemplifies the opposite view that all residences should pay equally for clean water. The second option is based on the assumption that all units served by sewers, whether new or old, should pay equally for centralized treatment and disposal. One supporting argument for the second option, is the fact that there is a greater uncertainty as to the cost of providing O&M and replacement services to on-site systems and that on-site system owners may see the potential for reduced rates as an incentive for proper system use. Which of these options would be most politically acceptable in your community?

In the community of Summerset a conflict developed over the financing of initial and future capital costs. This communty hopes to obtain construction grant funds to replace and upgrade approximately 40% of the existing on-site systems. The SAWS agency will then be responsible for providing all O&M and replacement services for the entire

EXHIBIT 5

AVERAGE BIG OAKS MONTHLY BILLS UNDER ALTERNATIVE USER CHARGE SCHEMES

	Charge Schemes		
User Category	#1	#2	#3
Existing Gravity Sewer/POTW	$ 4.25	$ 9.42	$ 8.74
Vacuum Sewer/POTW	10.43	9.42	8.74
On-site	6.20	6.20	8.74

community. The SAWS agency decided that those residents receiving new systems under the initial construction should be assessed for the debt service on the local share (a relatively small amount). However it was decided all users should contribute to the sinking fund for replacement of systems which fail in the future. The rationale was that since there will be no grant funds available to the sinking fund, owners of existing acceptable systems would be penalized if they were to shoulder the entire burden of the sinking fund. In addition the systems which are being replaced initially may eventually require major replacement or rehabilitation.

It is common practice in conventional wastewater systems to charge an intial hookup fee to help offset the capital costs. This approach tends to reduce the level of borrowing and thus reduces the finance charges. It is conceivable that this approach can be applied in SAWS as well. You could, for example, finance all of the cost and charge each resident a basic monthly rate of $10. However it might be more attractive to levy an improvements assesment on each lot of approximately $400 and lower the monthly rate to $6.

If a community is served by metered water, it is relatively easy to charge in proportion to water consumption. However, many small communities do not have metered water. How do such communities develop charge schemes which are proportional to the quantity of water treated? Frequently the number of bedrooms is used as an indicator of the quantity of wastewater generated in residential areas. While quite simple when the community is served by one technology, this approach can be quite complex when more than one technology is being implemented. For example a community with three service areas (existing sewer, acceptable on-site, and new on-site) and four bedroom categories (1,2,3, and 4 or more) could have twelve different rates.

SUMMARY

The most appropriate method for distributing the costs of a SAWS among the members of a community will vary from case to case. It is vital to examine the needs and traditional funding processes in a given community. However there are a few planning rules to keep in mind:

- Make sure all costs have been identified and considered.

- Determine which cost should be the responsibility of the SAWS agency and which cost should be the responsiblity of the private sector.

- Investigate the costs of obtaining cost-sharing funds in terms of administrative delays and loss of local control.

- Examine various methods of collecting the necessary local revenues.

USE OF PRIVATE FIRMS IN SAWS MANGEMENT

BACKGROUND

One of the key steps in designing a SAWS management program is determining institutional arrangements--that is, determining who will be responsible for providing SAWS management services. These responsibilities could be assigned to any of the groups listed below.

- Public agencies (including local, regional, and state organizations)
- Property owners (or occupants)
- Private organizations

Included in the last category are both profit-making firms, such as soil testers, system designers, contractors and septage haulers and non-profit entities, such as rural cooperatives, property owner associations.

The purpose of this paper is to provide SAWS planners with a framework for considering private profit-making firms in SAWS management. In many communities, public agencies and property owners may not be able to provide all of the necessary SAWS management services because of lack of technical or administrative skills, lack of interest in SAWS management, or high costs. This paper illustrates the types of roles private firms might perform in SAWS management, the potential advantages and problems in using private firms, the types of regulatory tools to control private firms, and the potential services that could be provided by private firms.

POTENTIAL PRIVATE FIRM ROLES

In considering private firms in SAWS management, it is useful to first examine potential roles and relationships.

Contractor/Consultant to Private Clients--In this role, the private sector has traditionally performed a number of SAWS activities, as listed below.

- Site feasibility analysis
- Facility and system design

- Facility and system construction and installation
- Facility and system maintenance
- Facility and system operation
- Facility and system monitoring
- System rehabilitation and repair

Most of these activities, particularly with respect to on-site systems, are familiar to SAWS planners. Private clients for these activities primarily include developers, businesses, and homeowners. Facility operations is probably the least familiar private sector role. It usually occurs when a private firm both owns and operates a facility. For example, in southern Florida, General Development Utilities, Inc. (GDU) owns and operates wastewater treatment facilities for two communities developed by the General Development Corporation.

Contractor/Consultant to Public Agencies--In this relationship, a number of activities may be performed.

- Facility planning
- Review of site feasibility data
- Review of facility and system design
- Inspection of facility and system construction and installation
- Inspection of facility and systems operations
- Maintenance of facilities and systems
- Contract operations of public facilities

The facility planning role is perhaps the most traditional and familiar one in this relationship. As discussed below, contract operations of public facilities is one of the most intensive uses (in terms of reliance on the private sector) of the private sector. The other activities listed are ones that are often performed by a public agency and, thus, are prime areas for determining public/private allocation of responsibility. In these other activities, private firms often act as an agent of the SAWS management agency.

Private Ownership of Facilities--In this situation, a private firm as an owner is responsible for the operations and maintenance of a facility. The public agency functions strictly as a regulatory body.

WHY CONSIDER USING PRIVATE FIRMS?

Such activities as site feasibility analysis and the design of wastewater systems are traditional private sector responsibilities. The difficult SAWS management decisions revolve around the use of private firms for traditional public agency roles. In general, reasons for using private firms to perform any SAWS management activities include the following.

- Cost Savings--It may be cheaper to use private firms instead of having public agency employees perform certain tasks. Private sector cost savings may be achieved through economies of scale. For example, a community with only 100 on-site systems might not be able to support the cost of one full-time maintenance inspector. Inspection costs per system would be reduced by contracting out to the private sector in this case because the private sector can spread the cost of an inspector over several communities. Similar economies of scale are possible in the operation of public facilities or when the management activity involves the purchase of capital equipment.

- The variability or periodicity of a particular management activity may also make it cost-effective to simply contract out for services. If, for example, new on-site systems are being installed infrequently, system design review and installation inspections may be cheaper to perform under contract depending on overall public management responsibilities and existing staffing. Similarly, complaints about system problems may occur primarily in wet weather seasons causing a potential "peak loading" problem for follow-up by public agency inspectors. It may be cost-effective to contract out for private firm services during peak load situations rather than to hire another public staff person.

- Availability of Expertise--One of the most persuasive reasons for seeking private sector help in SAWS management is the potential expertise of private contractors. Many of the communities implementing SAWS management programs are small and unable to attract and keep highly technical staff. This is particularly a problem in the operation of some small wastewater facilities. But it may also be an issue in reviewing on-site system designs, monitoring groundwater, or supervising system repairs. SAWS planners, of course, should also consider the use of other public agencies to perform these tasks under intergovernmental or intermunicipal arrangements.

- Liability--As discussed in the issue paper on "Personal and Property Rights and SAWS Liability", the greater the amount of control exercised by a management agency over SAWS, the greater the potential liability for problems that occur. Using a private firm for traditional private sector SAWS activities, such as system design, installation, and repair, keeps the liability burden with the private firm. For some traditional public agency responsibilities, such as facility ownership, private sector responsibility may, depending on the contractual arrangements, shift a portion of the liability to the private firm.[1]

- Public Acceptability--We have used the phrase "traditional private sector responsibility" quite frequently. In the context of public acceptability, the issue of public versus private sector roles is quite important, particularly in the management of on-site wastewater systems. For privately-owned on-site systems, homeowners in most parts of the country are used to dealing with private firms for many SAWS management activities. Disrupting the homeowner-private sector relationship by the public assumption of traditional private sector responsibilities may be politically infeasible.

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[1] See Urban Systems Research & Engineering, Inc., Private Sector Provision of Operation and Maintenance Services for Publicly-Owned Treatment Works. Prepared for EPA, July, 1980.

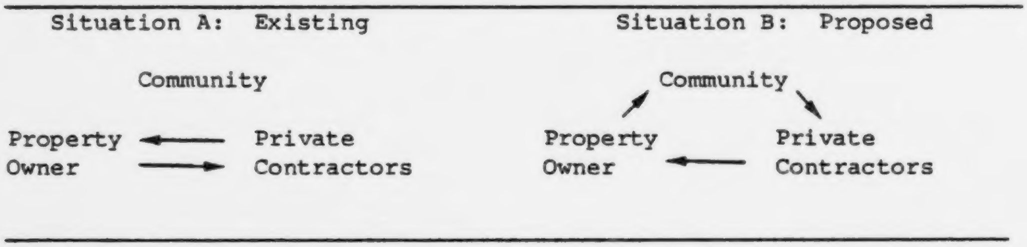
WHAT POTENTIAL PROBLEMS SHOULD BE CONSIDERED IN USING PRIVATE FIRMS?

Many of the problems associated with using the private sector fall under the evaluation criteria used in the overall planning methodology, namely: cost, performance, and implementation feasibility.

- Increased Administrative Costs--As indicated above, there are potential cost savings in using the private sector. But these cost savings may be illusory unless carefully examined. For example, the cost analysis of private sector assumption of on-site system inspections should include not only the actual costs of doing the inspection, but the administrative costs that remain with the public management agency. These costs may include recordkeeping, registration or certification of private firms, and monitoring of the private contractors' performance.

  Cost Distribution--Depending on how a private contractor's responsibilities are financed, use of the private sector may shift additional costs from the homeowner to the public management agency or vice versa. Either case may be politically unacceptable. Consider, for example, the following two models of on-site system maintenance.

POTENTIAL INSTITUTIONAL ARRANGEMENTS FOR SEPTAGE HAULING



Situation "A" depicts the existing relationship between the property owner and the private contractors (septage haulers) in a community. In this situation, property owners deal directly with their own septage hauler at a free market price. Situation "B" is a proposed new SAWS management arrangement which involves the community contracting with septage haulers. The community dispatches the haulers to homeowners on an as-needed basis and uses a manifest system to track septage pumpouts and disposal. Homeowners are billed by the community and pay the community a user charge for the service.

A simple transaction in Situation "A" with the property owner absorbing all of the costs is transformed in Situation "B" to one with a potentially different cost total and cost distribution. The cost of the pumpout itself may be lower if the town's contract with the pumpers gives them exclusive rights to the community. But the total cost of the pumpout now includes the administrative costs incurred by the community. The community may include administrative costs in its user charge to the homeowner, in which case the _homeowner_ bears the full cost of the pumpout (which may be lower or higher than Situation "A"). Or the community may pay for these administrative costs out of general revenues in which case public costs for the _entire_ community are increased.

- _Performance_--A private firm would presumably be used when it had expertise equal to or greater than a public agency. This is a critical judgement that has to be made by a SAWS management agency. In many cases, however, responsibility for a particular SAWS management activity will not involve a decision between a private firm or a public agency. The SAWS management agency's choices may be limited to only private sector alternatives. If the track record of the available private firms has been mediocre, _the SAWS agency may wish to consider techniques for ensuring quality control of the private sector._ These include: licensing, registration, certification, performance bonds, public agency inspections of private sector work, and recordkeeping. These are shown in Exhibit 1.

- Implementation Feasibility--There are a number of implementation feasibility issues that should be considered when using the private sector.

  Public Acceptability--Public assumption of traditional private sector roles, such as septage pumpouts or system installation, should be viewed with considerable caution. In other words, consider the tradeoffs carefully for any action that disrupts traditional private sector-client relationships.

  Administration--Delegating an activity to the private sector will generally involve some type of administrative arrangement between the private sector and the SAWS management agency. Several accountability techniques, for example, are possible to ensure performance. The point is to make the administrative aspects simple and to avoid costly complex arrangements.

  Conflict of Interest--Private sector responsibilities should be considered for potential conflict of interest problems. For example, using the same firm to inspect existing systems for maintenance problems and to pump out systems is a potential conflict of interest.

POTENTIAL PRIVATE FIRM RESPONSIBILITIES AND CONTROL TECHNIQUES

In designing a SAWS management plan or updating an existing management system, it is useful to consider the potential private sector responsibilities in terms of the major life-cycle phases of wastewater systems. This section also shows potential control techniques that can be applied by a SAWS management agency for ensuring satisfactory private firm performance.

EXHIBIT 1

POTENTIAL TOOLS FOR REGULATING AND CONTROLLING PRIVATE FIRMS IN SAWS MANAGEMENT

• Licensing	This technique regulates the private sector periodically by imposing limitations, conditions, or requirements on firms or individuals performing a particular activity. Example: licensing system repairers.
• Certification	This is a confirmation or assurance that one is qualified to perform an activity. It generally requires one to show evidence of competence and experience. Example: certifying system designers on the basis of their past credentials.
• Registration	Registration is less restrictive than the above techniques in that it only requires a person to inform a public agency that they are involved in an activity. Example: registering septage haulers.
• Performance Bonds	Performance bonds are financial guarantees for a fixed period placed on a person to ensure adequate performance of an activity. They are useful for regulating a private firm's performance on an activity-by- activity basis. If a firm's activity is judged unacceptable by a public agency, the bond is forfeited and used by the agency to complete or correct the task. The size of the bond should be commensurate with the cost of performing the activity. Example: requiring a $2,000 performance bond for an on-site system installation for a period of 6 months.
• Inspections	In this technique the public management agency performs on-site reviews on an occasional basis ensuring that a private firm's work is being properly performed. Example: inspecting on-site system installations.
• Recordkeeping	This is a requirement that can be placed on the private sector to record their activities. Example: as-built plan for system installation; manifest system to account for septage pumpouts.
• Contracts	Contracts are a formal legally-binding agreement between two parties indicating respective responsibilities and commitments. These should be used when hiring the private sector to perform a major SAWS management task, such as the operation of a publicly-owned facility. For short-term low-cost tasks, such as consultant services, a less formal letter of agreement is often used.

Pre-construction Phase: Planning and Design of Wastewater Systems

Typical private sector activities, clients, and potential accountability techniques that can be exercised by a SAWS management agency in this phase are summarized below.

Private Firm Activity	Client			Potential Control Techniques
	Public Agency	Private Developer	Property Owner	
Facilities Planning	X			Contract
Land Use Planning	X	X		Contract
Site Feasibility Analysis	X	X	X	Inspection; licensing; certification
System & Facility Design	X	X	X	Inspection; licensing; certification performance bond
Review or Witness Site Analyses	X			Contract/letter of agreement

Note that many public agencies will use one private firm (as their agent) on an as-needed basis to review the work of another firm that is doing work for a private developer or homeowner. In general, when a private firm is performing work for a public SAWS management agency, the easiest method for ensuring performance is through a traditional contract mechanism in which tasks, responsibilities, performance requirements and payment terms are clearly spelled out.

Installation/ Construction Phase

Typical private firm activities, clients, and potential control techniques in this phase are summarized below.

Private Firm Activity	Client			Potential Control Techniques
	Public Agency	Private Developer	Property owner	
Install/Construct Systems & Facilities	X	X	X	Inspection; licensing; certification; performance bond
Installation/Construction Inspections	X			Contract/letter of agreement

There are a number of ways to ensure that a private firm's performance is adequate in this SAWS phase. Licensing and certification are screening techniques that ensure general basic competence. In order to ensure that each installation or construction is done properly, however, more site-specific control techniques should be considered. Inspections at periodic critical periods are also desirable. (For example, for traditional on-site systems, inspection of leaching field fill, grade, and backfilling are important.) As-built plans are useful if future repair work is necessary and should be considered mandatory. Performance bonds are more discretionary. They allow the SAWS management agency to obtain some redress if the system fails after a fixed period of time, due to contractor's default or negligence. Attributing negligence, however, is very difficult. If installations are properly inspected, the need for contingency arrangements, such as performance bonds, should be minimized.

Note that the SAWS management agency can use another private firm as its agent to conduct installation inspections.

Operations Phase: Operation, Maintenance, Monitoring, and Repair Of Privately-Owned SAWS

This phase offers several options for involving private firms. Potential responsibilities for publicly-owned systems are considered in the next section.

Private Firm Activity	Client			Potential Control Techniques
	Public Agency	Private Developer	Property owner	
Routine Inspections	X			Licensing; certification; recordkeeping; contract
Routine Maintenance		X	X	Licensing; registration; recordkeeping
Routine Operation		X	X	Licensing; registration; recordkeeping
Water Quality Monitoring	X	X	X	Contract; recordkeeping
Repair/ Rehabilitation		X	X	Licensing; certification; as-built plan; inspections
Public Education	X			Contract/letter of agreement
System Repair Inspections	X			Contract/letter of agreement

In this phase, there are a number of opportunities for a private firm to act as the agent for a public SAWS management agency. For example, a public agency may need advice on the location of sampling points (particularly groundwater locations), frequency of sampling, and on parameters to be sampled. Samples will also typically require analysis at a commercial laboratory unless there are analytical capabilities available at a local or nearby wastewater or water treatment facility.

As seen in above list, recordkeeping may be used to monitor the activities performed by private firms for privately-owned SAWS. This technique is particularly important during the operation and maintenance (O&M) phase. For example, a private O&M firm in Maine that services aerobic systems for homes and businesses uses a recordkeeping system to record all its inspections and servicing. One copy of a completed service form is automatically sent to the State regulatory agency. This enables the agency to have an up-to-date record of how well systems are operating, what problems are occurring, and how often problems occur.

There is also an opportunity to use recordkeeping to systematically track the performance of traditional septic tank on-site systems. Private septage pumping firms could be required to use a manifest system to account for the pumping and disposal of septage. The potential benefits of such a manifest system are listed below.

- Capability to track maintenance/pumping on a system-by-system base
- Capability to ensure that only local septage is disposed at the septage disposal facility
- Capability to monitor the total amount of septage originating from the community (useful for planning expansions to the septage disposal facility)
- Capability to track septage pumping costs in the community

The design of a manifest system should consider: the type of form to use; the amount of information to obtain (the administrative burden on the septage pumper should be considered); who should get copies; how the information will be used; how to store and retrieve the data (a manual system versus computerized data processing); and the frequency of data analysis needs.

Operations Phase: Contract Operations and Maintenance of Publicly-Owned SAWS

While private firm operation of privately-owned wastewater treatment facilities is common, particularly in residential complexes served by package treatment facilities, the use of a private firm to operate and maintain public wastewater facilities is relatively new. The concept, however, has been extensively used in other municipal services, such as solid waste, transit, and water supply. As a SAWS planner you may want to consider private contract operations for the following reasons.

- If you expect to have difficulty getting qualified personnel (particularly for new facilities)
- If you want to reduce or keep down the number of public employees
- If you do not wish to be bothered by the day-to-day concerns of operating SAWS facilities

There also may be cost savings in using the private sector if a private sector firm is able to achieve economies of scale by operating other neighboring facilities. In addition, depending on how a contract is written, there is an opportunity to shift potential liability to the private firm.

There are three types of private firm contract operations approaches that you may want to consider:[1]

- Key Staff Person--In this model, the private firm supplies a program supervisor or other key personnel, such as a chief maintenance person, to supplement the existing wastewater management staff.
- Full Staffing--Under this arrangement, the existing facility staff is replaced or hired-in by the private firm. In this model, the firm agrees to provide all services relating to normal operation of the management system. The full staffing model gives the firm more control over the program by enabling it to select and employ the staff.

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[1] These models all assume continuous private firm presence at the facility. It is also possible, of course, to use private firms to provide traditional ad hoc troubleshooting and management guidance.

- Comprehensive Services--The contracting firm assumes complete responsibility for the staffing and the purchase of consumables under this model. The community pays one monthly invoice and the contractor assumes responsibility for the entire management program.

Besides taking the time to screen and select qualified firms for contract operations, one of the key issues in contract operations is the contractual arrangement itself. You should seek assistance from EPA or the state in developing and reviewing the contract document. The following items should be considered for the contract.

- Term of Contract--The first contract should be of short duration, perhaps only a year, so you can determine whether you are satisfied with the concept of contract operations and with the capabilities of the firm.

- Payment Method--Either a lump sum or cost-plus-fixed-fee (CPFF) are possible. For contracts extending for more than a year, the firm will probably want a cost escalation factor. Possible approaches are to have fixed periodic re-negotiations or to use locally-sensitive consumer price multipliers.

- Performance Guarantees--While the SAWS management agency remains legally responsible for meeting state and federal regulations, you may wish to negotiate performance guarantees with the private firm to ensure quality operation of the program. Performance bonds are sometimes used. For treatment plants, the percentage of time meeting state and federal permit requirements may be used to measure performance.

- Equipment Replacement--Because depreciation and operability of a facility's equipment are, in part, a function of the contractor's skills in operation and maintenance, you may wish to consider negotiating the contract such that the contractor is responsible for replacement parts up to a set amount for major pieces of equipment.

- Municipal Responsibilities--You should carefully allocate responsibilities for both your protection and the contractor's. For example, you may wish to keep control over a number of items, including the collection system or all purchasing.

- Termination Clause--You will need this as an escape valve if the contractor performs poorly. For your protection, if a contractor decides to end the arrangement, you should require at least 60 days notice so that you will have time to consider replacement possibilities.

- Liability--This is perhaps one of the most important items in the contract and one too complicated to discuss in detail here. Liability assignments and related insurance requirements in operations contracts generally involve three issues: hold harmless agreements; bodily injury and public property damage; and effluent damages. There are two types of hold harmless agreements. One legal model relates to parties suing each other. A hold harmless agreement between two parties means that if the first party is liable to the second, the second agrees not to sue the first party. The second hold harmless model involves an agreement between two parties such that if party A is liable for any reason, then party B will pay. In this example, party B holds party A harmless. In operations contracts, the two parties are the client community and the contractor. The other two liability issues relate to third-party suits. Bodily injury and property damage insurance includes accidents and damages that occur at the plant site. The contract should ensure that this coverage is obtained. Effluent damages are a liability responsibility for damages caused by the plant effluent off of the plant site. The liability clause of operations contracts vary. Contracts generally include mutual hold harmless agreements to prevent client versus contractor suits. In most cases, the firm assumes liability for any damages they cause on the plant site. Effluent damages beyond the facility are a municipal responsibility in all but a few very strictly limited cases.

SUMMARY

As seen from the foregoing discussion, there are a number of opportunities to use the private sector to perform SAWS management activities. In deciding whether to tap the private sector, you should initially consider each activity by itself. What would be gained by using the private sector--expertise, cost savings, liability reduction? How will public/user cost distribution be changed? How can the private sector be held accountable to the public? In any decision involving the use of the private sector, whether it be adding to the responsibilities or shifting them to the public sector, consider the implementation feasibility of such an arrangement. Will it be administratively possible to accomplish; is there sufficient legal authority to accomplish or allow it; will the decision be politically acceptable? By taking into account these considerations, you should be able to develop an acceptable and cost-effective arrangement for using the private sector in SAWS management.

CASE STUDIES

Acton, Massachusetts

COMMUNITY STATISTICS

Name: Acton, Massachusetts

Location: Suburb 25 miles northwest of Boston

Population 1980: 17,544 (census)
1995: 22,500 (estimate)

Technology: Septic tanks and 3 privately owned package plants

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Status: Draft Step 1 complete.
Pursuing Supplemental Step 1 for re-evaluation of specific areas.

WATER QUALITY BACKGROUND

The Problem

In the last thirty years, Acton has experienced rapid suburban growth changing from a rural to a residential area. The town has approximately 4,500 single-family, multi-family, commercial and industrial on-site wastewater systems serving 88% of the town. Three privately owned wastewater collection and treatment facilities accept waste from three apartment and condominium complexes. Since the mid-sixties three different studies have been performed concerning wastewater management options for Acton, with recommendations ranging from complete sewering of the town to maintenance of on-site systems. The most recent study, started in 1977 by Anderson Nichols Inc. with EPA and State Step 1 Facilities Planning funds, was a response to previous studies that recommended sewering the town. The Anderson-Nichols study addresses all land use, economics, technical, environmental and institutional aspects of wastewater management in the town. While Acton, in general, has had successful experience with on-site wastewater treatment the town is concerned about large quantity on-site disposal from multi-family and commercial and industrial uses as well as wastewater management in some of its older and more densely populated neighborhoods.

The Solution

In 1977, through EPA and State 201 funding, the town of Acton hired Anderson-Nichols Corporation to prepare a Step 1 Facilities Plan. A Wastewater Management Advisory Committee appointed by the Acton Board of Selectmen was chosen to work closely with the consultant. The Anderson-Nichols draft Step 1 Facilities Plan recommends the continuation of on-site management for the town of Acton. This selection was based, in part, on the results of a computer model to predict septic system failures in the town. As a result of the Facilities Plan and the on-going work of the Health Department, the Wastewater Management Advisory Committee is pursuing a 20-year program based on continued on-site disposal. The program includes: public education, wastewater volume reduction, wastewater source identification, water resources monitoring, optimization of management systems, and a corrective program for faulty systems. The Health Department is working on management improvements for the Septage Disposal Area.

WASTEWATER MANAGEMENT

Current Practices

On-site wastewater management in Acton is characterized by strict local regulation of system design, installation and operation. Active inspection and surveillance and detailed record-keeping insure compliance with regulations. Wastewater management in Acton is facilitated by a town owned and operated septage handling facility consisting of a lagoon system with an approved capacity of 14,000 gallons/day. This facility is now being re-evaluated due to town wells planned for the area.

Legal Responsibilities

Acton Health Department--carries out requirements of Title V of the Massachusetts Environmental Code for on-site disposal of domestic wastes in quantities below 15,000 gallons/day and the more stringent regulations adopted by the Acton Board of Health for subsurface sewage disposal.

Massachusetts Division of Water Pollution Control--administers 201 funding in the State.

Massachusetts Department of Environmental Quality and Engineering--reviews and approves plans for septage treatment facilities.

Management Responsibilities

Wastewater Management Advisory Committee--reviews findings of facilities planning and makes recommendations on wastewater management.

Acton Health Department consisting of a Director, Assistant and five member Board of Health--issues construction permits and operational approval for septic tanks which requires biennial pumping; takes action on complaints and suspected onsite system failures, sets design requirements for septic systems, licenses septage haulers and manages the coupon program that tracks septage quantity and pumping frequency and maintains files for each onsite system.

Acton Planning Board--administers township zoning and subdivision ordinances.

Acton Engineering Department--responsible for review and inspection of subdivisions and review of 201 and 208 planning along with other local agencies.

Town Treasurer--sells coupons to licensed septage haulers who haul septage to the town septage disposal facility.

Acton Highway Department--maintains municipal septage disposal facility.

Homeowner--responsible for maintenance of system.

Staffing

The on-site management program in Acton is staffed by the Acton Health Department consisting of the Director of Health and his assistant. The Health Department is supervised by a five member Board of Health. Plan, site, installation and operational approvals are all provided by the Health Department. Other staff for the program include one full time employee to manage and operate the Septage Disposal Facility, and the Town Treasurer to sell coupons to septage haulers. Additional support for the program is provided by private haulers to pump and haul septage, professional engineers to design individual systems, sanitarians to test subsurface disposal sites, contractors to install systems, and the Wastewater Management Advisory Committee.

Financing

Acton's on-site management program is financed through general revenues of the town's Health and Highway Departments. Neither of these agencies specifically account for on-site management costs. The Health Department also charges septage haulers $8.00 per 1,000 gallons of septage through the use of coupons. These funds, however, are channeled into general revenues. Homeowners pay septage haulers a separate fee for pumping and other maintenance services.

The information in this case study was compiled in June of 1982 and updated in April of 1983.

RULES and REGULATIONS
of
ACTON BOARD OF HEALTH

INCORPORATED-1735
ACTON

Adopted on December 18, 1979

ARTICLE 5. REGULATIONS RELATIVE TO SEPTAGE DISPOSAL AREAS IN ACTON

Regulation 5-1. Definitions

5-1.1 Septage - That material removed from any part of a septic disposal system.

5-1.2 Septage Hauler - Person (s) or corporations licensed by the Town of Acton to collect, transport and discharge septage.

5-1.3 Lagoon - An impoundment used for the storage and treatment of septage.

5-1.4 Septage Disposal Area - The area approved by the Acton Board of Health for the storage and handling of septage wastes.

5-1.5 Sludge - The solid fraction of sewage.

5-1.6 Septage Disposal Coupon - The coupon purchased at the Town Treasurer's office to be presented to the attendant at the septage disposal area. This coupon allows the septage hauler to discharge 500 gallons of septage into the facility.

5-1.7 Trip Ticket - A form which contains pertinent information on the location that generated septage.

5-1.8 Sludge Disposal Area - That part of the septage disposal area used for handling/storage of sludge.

Regulation 5-2. Assignment

5-2.1 The Acton Board of Health may assign an area to be operated as a septage disposal area if it meets reasonable engineering design criteria and is not degrading to the environment. Pollution of groundwater shall be a prime concern.

5-2.2 Plan of Septage Disposal System - The submitted plan must show as a minimum: location and dimensions of the system, design calculations, existing and proposed contours, location and log of deep observation holes, location and results of percolation tests, location of any streams, surface and subsurface drains and wetlands within 1,000 feet of the septage disposal system, known sources of water supply within 1,000 feet of the system, location of any proposed well to serve the lot, location of water lines on the property, maximum ground water elevation in the area of the sewage disposal system, and a profile of the system. The plan must be prepared by a Professional Engineer or other professional authorized by law to prepare such plans. Also, the design engineer shall submit a proposed operating procedure for the Board's review and approval.

5-2.3 The Board of Health may, at its discretion, require an Environmental Impact Study on the plans.

5-2.4 The Acton Board of Health may revoke assignment of a septage disposal area when an inspection reveals that it is not in complete compliance with these regulations or with the terms of the assignment, or when there is found to be a serious potential or actual degradation of the environment.

Regulation 5-3. Administration

5-3.1 The facility shall be staffed by a full-time custodian.

5-3.2 Only those septage haulers who are licensed with the Town shall be authorized to discharge septage at the facility.

5-3.3 By vote of the Board of Health there shall be a user's fee for the purchase of septage disposal coupons. The fee shall be revised as necessary by the Board of Health.

5-3.4 Septage haulers shall present to the custodian, Trip Tickets and Septage Disposal Coupons before discharging any septage. Trip Tickets, prepared by the Board of Health shall be obtained from the custodian as needed and shall be filled in by the hauler.

5-3.5 Septage Disposal Coupons, shall be purchased at the Town Treasurer's Office, Town Hall, between the hours of 8:00 A.M. to 4:30 P.M., Monday through Friday.

5-3.6 The custodian shall collect the Septage Disposal Coupons and Trip Tickets and shall make the appropriate entries onto the Custodian's Daily Log.

5-3.7 Septage haulers shall gain emergency access to the Town's Septage Disposal Area during evenings, Sundays and Holidays by obtaining a key to the facility from the Acton Police Station.

5-3.8 Trip Tickets and Septage Disposal Coupons shall still be required to discharge septage on an emergency basis.

5-3.9 The gate to the facility shall be secured by the hauler after emergency use and the key to the facility shall be returned to the Acton Police Station.

5-3.10 The custodian shall return the Septage Disposal Coupons, Trip Tickets and Custodian's Daily Log to the Board of Health office at the end of each day.

5-3.11 The Trip Tickets shall be filed in permanent record folders maintained by the Board of Health.

5-3.12 The Custodian's Daily Log shall be kept on record by the Board of Health office for a period of at least twelve (12) months.

5-3.13 A Septage Disposal Area Monthly Log, shall be completed by the custodian and kept as a permanent record by the Board of Health office.

5-3.14 The Septage Disposal Coupons shall be forwarded to the Town Treasurer's Office for final disposition.

5-3.15 Only septage collected from property in the Town of Acton shall be discharged at any septage disposal area within the Town of Acton.

5-3.16 Persons collecting septage in Acton and discharging out of Acton shall still be required to forward "Trip Tickets" to the Acton Board of Health for filing. Failure to do so is subject to a $25.00 fine and/or loss of license.

5-3.17 The town shall provide sufficient water, disinfecting agents, materials and area to insure proper washing and sanitizing of contaminated items.

Regulation 5-4. Prohibitions

5-4.1 There shall be no private septage disposal areas within the boundaries of the Town of Acton as long as the Town of Acton maintains a Public Septage Disposal Area.

Regulation 5-5. Penalties

5-5.1 Any person(s) who discharge septage collected from property outside the limits of the Town of Acton shall have their Septage Disposal Permit (Regulation 19.1, Title 5, State Environmental Code) automatically revoked and upon conviction be fined not less than $500.00 nor more than $1,000.00.

5-5.2 Any person violating any of the provision of this Article for which a penalty is not otherwise provided in this Article, shall upon conviction, be fined not less than $25.00 nor more than $50.00.

ARTICLE 11. MINIMUM REQUIREMENTS FOR THE DISPOSAL OF SANITARY SEWAGE IN UNSEWERED AREAS.

Regulation 11-1. The Board of Health of the Town of Acton, Commonwealth of Massachusetts, acting under the authority of Chapter 111, Section 31, of the General Laws and amendments and additions thereto, and by any other power thereto, enabling and acting thereunder and in accordance therewith, has, in the interest of and for the preservation of the public health, duly rescinded all previous Rules and Regulations pertaining to the construction or installation of cesspools or septic tank systems adopted by the Board of Health, Town of Acton, and has duly made and adopted the following Rules and Regulations pertaining to the construction or installation of on-lot sewerage disposal works.

Regulation 11-2. The provisions of the Environmental Code, Department of Environmental Quality Engineering, Commonwealth of Massachusetts, "Minimum Requirements for the Subsurface Disposal of Sanitary Sewage", plus any and all amendments and additions thereto, apply to all permits issued by the Board of Health, Town of Acton. Where the following rules and regulations of the Town are more stringent, they shall prevail. All work done by permit shall conform to the specifications, workmanship and requirements of the State and town rules and regulations. Any variance, additional clarification or unusual conditions not covered herein shall be noted in writing on the original application, any variance approved, shall become a part of the permit. The Board of Health may vary the application of any provision promulgated by the Board with respect to any particular case when, in its opinion, the enforcement thereof would do manifest injustice; provided, that the decision of the Board of Health shall not conflict with the spirit of these standards. (See Regulation 21, Title 5 State Environmental Code). Any variance granted by the Board of Health shall be in writing. A copy of any such variance shall, while it is in effect, be available to the public at all reasonable hours in the office of the Board of Health.

Regulation 11-3. Definitions

The definitions listed in Title 5 of the State Environmental Code, shall apply.

Regulation 11-4. Permits

11-4.1 No local sewage disposal works shall be constructed, modified, expanded, altered or installed in the Town until a permit for such construction has first been obtained from the Board of Health. The application for a permit must be signed by the land owner or his authorized agent. It shall be the responsibility of the land owner to see that work by the disposal works installer is done in accordance with the permit issued. The agent or inspector of the Board of Health may make periodic inspections of the work in progress and bring minor problems to the attention of the owner. However, any major construction problem or deviation from the provisions of the permit will automatically revoke such permit. Final approval by the Board of Health will be granted only if the work agrees with the drawings and related data accompanying the permit issued by the Board of Health.

11-4.2 All sewerage work permits issued by the Board of Health shall expire one year from date of issue. The work shall commence within 90 days of issuance of the permit, if not, the permit will become null and void.

11-4.3 All Disposal Works Installers shall obtain a Disposal Works Installer's permit from the Board of Health. Such permit shall expire at the end of each calendar year. (Refer to fee schedule.) Applicants for such permits shall submit in writing a list of three references(preferably State and local health inspectors)who can attest to the experience of the applicant in construction or repair of sewage disposal works. For good and sufficient reason, the Board of Health may waive this regulation.

Regulation 11-5. Application

11-5.1 The land owner is responsible for obtaining the necessary soils tests, construction drawings and related data to complete the application.

11-5.2 No application shall be accepted until the data required herein and plans are furnished and the fees are paid.

11-5.3 It shall be understood that the owner shall supervise or provide adequate supervision of construction of those works for which application is made and shall be responsible for providing adequate facilities for each dwelling unit.

Regulation 11-6. Fees

11-6.1 The fee for a permit for sewage disposal installation shall be set by the Acton Board of Health. FEE ??

11-6.2 There shall be a fee set by the Acton Board of Health for the witnessing of percolation tests and deep observation holes based upon the maximum number of building lots per parcel according to the Acton Zoning By-Law Map. A percolation testing and deep observation hole testing permit will be good for one year from date of issue.

11-6.3 Permit renewals shall not require an additional fee.

Regulation 11-7. Plans to Accompany Applications

11-7.1 The following data and plans must be furnished with the application forms: a. A plan of the lot, showing the layout of the sewage disposal system in detail, indicating elevations, construction details, types of materials to be used, distances from house and lot lines, and any other pertinent data. b. Specifications of the work to be done must accompany the layout plan. c. The results of the percolation tests, soil examinations, and water table determination.

11-7.2 If any changes are made in the plan or specifications, a revised plan shall be submitted. A suitable area must be designated by outline as being reserved for a 100% relocation of the leaching works.

11-7.3 All plans and profiles for household sewage disposal works shall be drawn on paper measuring 11 inches top to bottom and any reasonable width suitable for folding and filing in a standard 8.5 inch x 11 inch filing folder.

11-7.4 All plans and data sheets must bear the stamp and registration number of a Registered Professional Engineer or Registered Sanitarian registered in the Commonwealth of Massachusetts. Any revised plan shall be prepared by a Registered Professional Engineer or Registered Sanitarian and shall be the "as built" plan. Field notes will not be acceptable. An "as built" plan shall be submitted by the licensed Disposal Works Installer.

Regulation 11-8. Soil Classification

11-8.1 Much of the soil in Acton is not suitable for subsurface leaching as a means of sewage disposal. Other soils are acceptable for this use as long as the subsurface systems are not closely spaced, and the remaining other small areas of soil types have only slight limitations.

11-8.2 The ability of the soil to receive sewage effluent is primarily a function of the soil's continuing permeability. This means that the soil must permit sewage to move through it at a reasonable rate and provide somewhere for it to go. In general, the subsurface movement of sewage is restricted by clogging or swelling of soils and the natural impervious layers or barriers within the soils restrict where the sewage may go.

11-8.3 Soils will be observed to a depth of at least four(4) feet below the bottom of the proposed leaching and expansion areas to prepare a soils log of the soils.

11-8.4 The location of test holes shall be shown on the site plan.

11-8.5 The results from the soils investigations shall be shown in profile on the plans to accompany applications for sewage work permits and shall identify types of soils encountered and depths at which changes in soils occur.

11-8.6 At least two deep test holes will be dug in the proposed location of each leaching facility.

11-8.7 These deep test holes may be dug in all months except June, July, August, September, and October.

11-8.8 Depending on the soil condition it may be necessary to increase the number of deep test holes.

11-8.9 The Acton Board of Health shall schedule the time and place that such tests are to be made in conjunction with the owner, developer or agent of the land.

Regulation 11-9. Percolation Test

11-9.1 General - The suitability of the soil for sewage disposal purposes shall be determined from the results of tests conducted as described below, and from the type of underlying soil, maximum ground water elevation, presence of ledge, drainage conditions, and other related data.

11-9.1.1 Percolation tests as prescribed in this section shall be performed at no expense to the approving authority by a Registered Professional Engineer, Registered Sanitarian, or other person who in the opinion of the approving authority is qualified to perform such tests. All percolation tests shall be performed in the presence of a representative of the Board of Health. The cost of labor and equipment necessary to dig test holes and the provision of water for conducting the percolation tests shall not be at the expense of the approving authority.

11-9.1.2 Percolation tests shall not be made in test holes that have remained open to the atmosphere for more than three days, nor shall they be made in frozen ground.

11-9.1.3 Percolation tests shall not be made in filled ground unless the soil has been mechanically or hydraulically compacted or allowed to settle for a period of six months.

11-9.1.4 The minimum leaching area to be installed shall be determined from Table 1, Regulation 14.

11-9.2 Percolation Test Procedures:

11-9.2.1 Prepare two test holes in the disposal area of at least 12 inches in diameter with vertical sides at least 18 inches deep.

11-9.2.2 Establish a fixed point at the top of the test hole from which all measurements can be taken.

11-9.2.3 Scratch the bottom and sides of the test hole to remove any smeared soil surfaces. Either add two inches of coarse sand to protect the bottom from scouring or insert a board or other impervious object in the hole so that water may be poured down or on it during the filling operation.

11-9.2.4 Carefully fill the hole with clear water to a minimum depth of 12 inches and maintain the water level by adding water as necessary for purposes of subsoil saturation, but in no case less than 15 minutes after saturation.

11-9.2.5 After saturation, if the water level drops to a depth of nine inches in less than 30 minutes, measure the length of time in minutes for it to drop from a depth of nine inches to a depth of six nches. If the drop per minute is erratic, that is increasing or ecreasing, the hole shall be refilled and soaked until the drop per ncrement of time is steady. The time divided by three for the level to drop three inches will be the percolation rate.

11-9.2.6 If the initial 3-inch drop requires more than 30 minutes rate equal to more than 10 minutes per inch) the soil shall be saturated y filling the hole to the top and maintaining it full for at least our hours. The soil shall then be permitted to swell overnight so hat the soil condition will approach that which exists during the ettest season of the year. After the overnight swelling period, he test shall be made again by filling the hole to a 12-inch epth and measuring the 9-to-6-inch depth drop as in 11-9.2.5 above.

11-9.3 Subsoil and Ground Water Determination: The Board of ealth shall require that two or more deep observation holes be dug o a depth of at least four (4) feet below the bottom of the proposed eaching facility. The Board may also require additional test holes o be dug to determine the maximum ground water elevation or the levation of impervious material. Observation holes shall be reuired in the expansion area by the approving authority or its agents.

Regulation 11-10. Ground Water

11-10.1 The maximum ground water elevation expected during the ettest season of the year shall be determined and regarded during soils investigations. The leaching facilities shall be constructed minimum of four (4) feet above the high water elevation.

11-10.2 When high ground water or evidence of seasonal high evels of ground water such as mottling or oxidation reduction stains re observed during soils investigations, interceptor drains may be equired.

Regulation 11-11. Impervious Material

11-11.1 Excavations into or fill upon impervious material shall not be allowed.

Regulation 11-12. Minimum Distances

11-12.1 Disposal facilities shall be constructed not less than the minimum distances away from items listed in 3.7 of Title 5, State Environmental Code with the following additions.

11-12.2 No sewage disposal system shall be constructed within one hundred (100) feet of any known source of water supply or tributary thereto. No sewage disposal system with a capacity of less than 2,000 gallons per day shall be constructed within seventy-five (75) feet of any great pond, stream, brook, river or swamp. No sewage disposal system with a capacity of 2,000 gallons/day or over shall be constructed within one hundred (100) feet of any great pond, stream, brook, river, or swamp, with the exception of repairs or alterations to disposal systems approved prior to the enactment of this regulation.

11-12.3 In the area designated as the Flood Plain District by Zoning Map of the Town of Acton, Massachusetts, Map No. 2, Sheet A, Flood Boundary and Floodway Map', ' Zoning Map of the Town of Acton, Massachusetts, Map No. 2, Sheet B, Flood Insurance Rate Map' and the associated data provided in the 'Flood Insurance Study, Town of Acton, December 1977', published by the U.S. Department of Housing and Urban Development, Federal Insurance Administration ('HUD Flood Insurance Study'), on-site waste disposal systems shall be located or designed so as to avoid impairment or contamination during flooding.

Regulation 11-13. A sewage disposal system shall be located on the same lot as the structure it serves. A water supply well shall be located on the same lot as the structure it serves.

Regulation 11-14. Residential Septic Tanks - Minimum Requirements

11-14.1 All residential septic tanks constructed or installed hereafter shall be of concrete and have minimum capacities as given in Table 1. For additional bedrooms numbering in excess of that given, the capacity of the septic tank shall be enlarged by 250 gallons for each additional bedroom. In dwellings provided with unfinished rooms, the greatest possible number of bedrooms shall be used to determine the capacity of the septic tank.

11-14.2 Business, Industrial and Commercial septic tanks shall have a minimum capacity of twice the proposed daily flow.

11-14.3 Inlet pipes to septic tanks shall be extra heavy cast iron or schedule 40 p.v.c. and all septic tanks shall be equipped with cast iron or p.v.c. inlet tees, unless tanks are equipped with built-in tees. Schedule 40 p.v.c. requires an approved sleeve where the pipe goes through the building foundation.

11-14.4 The use of multiple tanks either in series or in parallel hall not be permitted for service unless the first tank meets the inimum capacity required by these regulations.

TABLE 1

UNIT SIZES FOR SEWAGE WORKS

Number of Bedrooms	Minimum Septic Tank Capacity (gals.)	Minimum Leaching Area (sq. ft.)
2	1,000	800
3	1,000	800
4	1,000	900
5	1,250	1,000
6	1,500	1,200

11-14.5 All residential septic tanks, cesspools or other tructures shall have their contents pumped out by a septage hauler icensed by the Town of Acton once every two years.

11-14.6 Business, industrial or any other type use of septic ank and/or grease traps shall have their contents pumped out by a eptage hauler licensed by the Town of Acton as follows:

Septic tank under 1,000 Gal. - once/2yrs.
Septic tank over 1,000 Gal. - once/yr. minimum

11-14.7 Septic tanks and grease traps may be required to be umped at more frequent intervals if directed by the Board of Health.

Regulation 11-15. Leaching facilities - Minimum Requirements

11-15.1 Leaching facilities for dwelling units shall be constructed to meet the requirement given in Table 1. Leaching facilities for ther than dwelling units shall have a 2.0 sq.ft. of leaching area er gallon of effluent and a minimum of 800 sq. feet of leaching area. oils with high percolation rates may require larger systems based on itle 5, State Environmental Code. Any soil with a percolation rate ver 20 minutes per inch drop is considered impervious and will not e approved as a site for constructing subsurface leaching facilities.

11-15.2 Any effort to excavate and replace impervious soils with ervious fill will not be approved unless percolation tests and soils ampling demonstrate that the bottom of such excavation has 4.0' of ervious soil. Also, the mounding of pervious soils over undisturbed oils shall not be approved unless soil sampling and percolation tests emonstrate that the undisturbed soil is 4.0 feet thick and is pervious.

11-15.3 No sewage disposal system shall be constructed in fill laced upon impervious material.

11-15.4 Leaching facilities shall be as listed in Title 5 of the tate Environmental Code.

11-15.5 The Board of Health may request that certain trees or foliage be removed if in their estimation they feel said trees may develop root growth that may interfere with the proper operation of the system.

11-15.6 Leaching works constructed in areas where the underlying natural soil material is not sharp coarse sand or sharp gravel shall have a minimum of 6" of clean bank run gravel placed beneath the stone.

11-15.7 The Board of Health or its agents may require this minimum 6" of gravel at its discretion, regardless of the type of underlying soil material.

11-15.8 The natural 4' - 0" minimum requirement of naturally occurring pervious soil material may not be lessened in order to provide room for this requirement.

11-15.9 The compaction of undisturbed soil by wheels of vehicles or the feet or workmen should be avoided and care should be exercised to prevent the smearing of surfaces by trenching and excavating equipment. All leaching surfaces are to be hand raked. Unprotected excavations that have surface water enter before the construction is complete shall be judged damaged by silt and not acceptable for construction in that condition. The bottom of leaching facilities shall be level. Effective leaching area for beds shall be based on bottom area only. The minimum depth of clean washed stone 3/4" - 1 1/2" in size shall be 12 inches measured below the invert of the distribution pipes.

11-15.10 State Code requirements for trenches and pits may be used subject to the approval of the Board of Health, except that when the area between leaching trenches is used the trench walls must be a minimum of twelve (12) feet apart.

Regulation 11-16. Subdivision Requirements

11-16.1 Extreme care shall be practiced on the layout of a subdivision in unsewered areas. The number of lots to be tested in a subdivision shall be determined by the Board of Health based on the site examination. Such tests shall include deep observation holes and percolation tests for each area selected. A permit shall be required for each individual house lot per Section 4 but information from prior testing for subdivision approval can be used providing the leaching area falls within the area previously tested.

Regulation 11-17. Garbage Disposal Units

11-17.1 Garbage disposal units are prohibited in the Town of Acton without first obtaining a permit. The minimum size of the septic tank must be at least 100% greater than the minimum requirement shown on Table 1 and the leaching field must be at least 50% greater than the minimum requirements shown on Table 1 before a permit shall be granted.

Regulation 11-18. Septic Tank Additives

11-18.1 The use of enzymes, degreasers or other additives in the septic system shall be prohibited unless approved by the Board of Health.

Regulation 11-19. Inspection

11-19.1 The owner of the property and the Disposal Works Installer are responsible for the construction of local sewage disposal works and shall have such construction inspected by the Board of Health or its Agent. These inspections shall be performed: after the leaching area has been excavated (before stone is added) and before construction is covered. Additional inspections may be required at the discretion of the approving authority. Sewage pumps and appurtenances are to be inspected and approved prior to regular use.

Regulation 11-20. Backfill

11-20.1 Backfill shall be free from large stones, frozen clumps of earth, masonry, stumps, or waste construction material. Machinery which may crush or disturb the alignment of pipe in the disposal system shall not be allowed on any part of the disposal area.

11-20.2 All lines in leaching facilities shall be left uncovered ntil after inspection. Contractors shall leave the cover off the istribution box and have ten (10) gallons of water on site for use f the inspector to test the level of the distribution box and outlet ater flow.

11-20.3 The owner shall take the necessary precautions to see hat the works are not damaged by surface waters, animals or other gents while awaiting inspection.

11-20.4 All leaching facilities, except for those under pavement, hall have a final cover of sufficient loam to support a dense egetative cover, preferably grass. Those leaching facilities and ther parts of the subsurface sewage disposal system in paved areas hall be insulated when necessary to prevent freezing.

Regulation 11-21. Plumbing Fixtures

11-21.1 Effective with the publication of these regulations all ew construction requiring plumbing fixtures shall have installed ow water use fixtures, commonly called water saving devices, on ll shower heads, water closets, kitchen and lavatory faucets.

11-21.2 All replacement fixtures for repairs or alterations hall be low water use fixtures unless waived by the Plumbing Inspector n the basis of economic hardships and/or construction difficulties.

11-21.3 Any person(s) aggrieved by an action of the Plumbing nspector with regard to the above regulation, can request a Hearing or a variance before the Acton Board of Health. To file for a ariance a written request must be received by the Board of Health at east seven days prior to the regular Board of Health meeting.

11-21.4 Any variance or other modification authorized to be made by this article may be subject to such qualification, revocation, suspension, or expiration as the Board of Health expresses in its grant. A variance or modification authorized to be made by this article may otherwise be revoked, modified, or suspended, in whole or in part, only after the holder thereof has been notified in writing and has been given an opportunity to be heard in conformity with the requirements for an order and hearing.

Regulation 11-22. Gas Traps (Interceptors)

11-22.1 All gas traps shall conform to Section 9 of the Massachusetts Plumbing Code.

11-22.2 All gas traps shall be cleaned once every two years by a firm licensed for hazardous waste collection and disposal. Proof of cleaning shall be presented to the Board of Health and will be made part of the official files of the agency.

11-22.3 The leaching portion of the gas trap shall be a minimum of 350 square feet and shall be designed on the percolation regulations of Title 5, State Environmental Code.

11-22.4 The gas trap shall be inspected by the Plumbing Inspector and the leaching portion shall be inspected by the Board of Health Agent(s).

11-22.5 Design criteria for leaching facilities shall conform with Regulations 9, 10, 12 of Article 11 of this Code.

Regulation 11-23. Occupancy Permits

11-23.1 A Certificate of Occupancy shall not be issued until a certificate of compliance shall have been issued first indicating that the sewage disposal system has been located and constructed in compliance with the terms of the permits and the requirements of this code and Title 5 of the State Environmental Code. All applications for occupancy of houses without town water must be accompanied by a report from an approved private laboratory, certifying that the quality of the potable water meets the requirements of the U.S. Public Health Service recommendations for drinking water. The quantity of water should be 5 gallons per minute for 4 hours continuous pumping to meet F.H.A. and V.A. requirements.

11-23.2 An application for an occupancy permit shall constitute a permit when signed by the Building Inspector, Gas and Plumbing Inspector and the Board of Health.

Regulation 11-24. Nuisance

11-24.1 Every owner or occupant of a premises in which there s a local sewage disposal works shall keep the same in a sanitary ondition and shall have the same emptied and cleaned when necessary. he Board of Health can determine the necessity for emptying and leaning a sewage disposal works. No septic tank, cesspool or eaching pit shall be emptied except by persons licensed by the

d of Health. If the owner or occupant fails to comply with
order. the Board may cause the nuisance, source of filth, or
e of sickness to be removed, and all expenses incurred thereby
l be paid by the person who caused or permitted same, if he
had actual notice from the Board of Health of the existence
eof.

gulation 11-25. Demolition and Removal

11-25.1 If a building serviced by an individual sewerage dis-
l system is demolished or removed, the following rules and
lations shall apply.

11-25.1.1 Septic tanks shall be pumped of all liquid effluent
then backfilled in with clean soil.

11-25.1.2 Cesspools and leaching pits shall be pumped of all
id effluent and then backfilled in with clean soil.

11-25.1.3 Leaching fields, if saturated, shall be pumped out
abandoned.

11-25.1.4 Seepage pits and ameration chambers shall be pumped
ll liquid effluent.

11-25.1.5 The Board of Health representative shall be notified
the work shall be accomplished in a manner satisfactory to the
ector.

Waynesville, Illinois

COMMUNITY STATISTICS

Name: Waynesville, Illinois

Location: Rural community in the northwest corner of DeWitt County, 15 miles southwest of Bloomington

Population: 1979--569 (census)
2000--644-700 (projection)

Technology: Septic tanks,(existing)
Community mound, cluster system and septic tanks (proposed)

Contacts: John W. Mitchell
Architectural & Engineering Service Corp.
142 E. Prairie Avenue
Decatur, Illinois 62523
(217)429-5117

Status: The village received a combined Step 2 and 3 grant from EPA. Construction began on November 8, 1982, and was 50% complete as of April 1983.

WATER QUALITY BACKGROUND

The Problem

All structures in Waynesville have on-site sewage disposal. The 244 structures include 225 houses and 19 non-residential buildings. About 50% of the systems conform to the Illinois Department of Public Health (IDPH) code. Another 25% treat household blackwater but discharge grey water into drainage tiles or roadside ditches. In the remaining 25% of the systems, the septic tank is directly connected to tiles or a ditch.

The Illinois D.P.H. is requiring the community to bring all systems into compliance with the IDPH private sewage disposal code.

The Solution

Waynesville hired Architectural and Engineering Service Corporation (AESC) to do a Step 1 Facilities Plan. The selected alternative uses on-site systems on lots suitable for seepage fields and sets up a cluster system for the small or poorly drained lots. The cluster system serves 55 homes and the business district and drains to a mound system located on the edge of the settled area. In addition to the construction of the cluster system, all on-site systems will be improved. Access risers will be installed on acceptable on-site systems. Combinations of improvements including new tanks and new soil absorption systems will be made to all unacceptable on-site systems.

WASTEWATER MANAGEMENT

Current Practices

A sanitarian from the DeWitt County Health Department inspects all on-site systems 3 to 4 times during construction.

Legal Responsibilities

IDPH -- on-site systems including sand filters under private management.

IEPA -- all wastewater systems with a surface discharge and sand filter systems under public management.

DeWitt County Health Department -- authority to issue permits for on-site systems and do construction inspections and maintenance surveillance.

Village of Waynesville -- authority to construct, own and operate wastewater collection and treatment systems on public and private property.

PROPOSED MANAGEMENT PLAN

Legal Responsibilities

Under the Illinois Wastewater Disposal Zones Act, communities setting up disposal zones can publicly manage on-site wastewater systems. Such systems qualify as an alternative technology eligible for 85% Federal funding to cover rehabilitation and replacement of existing on-site systems incorporated in the management plan. To establish their disposal zone, Waynesville adopted a sewer ordinance which forms the disposal zone and regulates on-site and cluster systems. The Waynesville ordinance:

- Establishes zone boundaries (coterminous with the initial service area);
- Describes the public benefit of the zone and the type and number of systems included;
- Defines and assigns management responsibilities;
- Regulates connections to the cluster system; and
- Prohibits discharge of substances harmful to the cluster and on-site systems.

A copy of the ordinance follows this case study.

Management Responsibilities

Initial construction expenses have been funded with a construction grant. After construction is complete, property owners will pay for new system installation. Under the disposal zone ordinance, property owners are responsible for the operation and maintenance of all interior plumbing and the sewer between the building and the septic tank. The village is responsible for expenses and operation of everything downstream of the septic tank inlet. The village will do routine inspections of all tanks every two years.

The DeWitt County Health Department will continue to regulate and supervise on-site system installation.

Private contractors will pump out tanks as needed and dispose of residuals. Groundwater sampling and testing will also be privately contracted.

All management activities and the responsible agencies are listed in Exhibit A.

Staffing

The village will have one staff person to conduct all the village disposal zone tasks specified in Exhibit A. Wastewater operator certification is not a requirement for the staff person. If the state requires a certified operator, the consultant recommends that the village contract with the DeWitt County Sanitarian to do troubleshooting and design of replacement systems.

Private contractors will pump septic tanks and dispose of septage.

Groundwater tests will be done under contract with a private or public laboratory, possibly the Clinton or Decatur sewage treatment plant chemists.

Finances

The estimated revenue requirements for the proposed construction and management program are listed in Exhibit B. Initial construction costs are estimated at $616,000. An 85% EPA construction grant is expected to provide $518,500. The remaining local share will be a combination of local funds, $23,000, and a FmHA 20 year loan of $70,000 at 5% interest. (The local share includes $6,000 of grant ineligible costs.)

The estimated annual revenue requirements for the management program are $12,600 or $1,800 a month. Payments on the FmHA loan will be $6,000 a year. Annual disposal zone operation and maintenance costs are estimated at $8,200 including septic tank inspection and pumping, groundwater testing, maintenance of sand filter systems, minor repairs to on-site systems and general program administration. The consultant estimated annual replacement costs for the entire system at $6,800, which includes labor, materials, backhoe operation and any other costs of normal repair and/or replacement of any part of the utility.

The connection fees and monthly service and debt charges for the Waynesville SAWS system are specified in the Wastewater Service Charges Ordinance. The ordinance adopted by the village Board on October 4, 1982, gives property owners two payment options. Method 1 allows the property owner to pay a lower initial connection fee and a larger monthly fee that includes debt service. Method 2 has the property owner pay a larger connection fee to cover initial capital costs. Under this method, the monthly fee includes operation, maintenance, and repair costs.

The connection fees are divided into five categories which vary by the type of work required on the original system. Systems requiring no action or minor rehabilitation work have the lowest connection fees. The second category includes properties that require new drainage systems, but have acceptable septic tanks. Systems that require both new septic tanks and drainage systems are the third category. The laundromat and the schoool are each separate categories. The monthly fee for operation, maintenance, and repair is $5.12 for all properties except the school and laundromat. Debt service varies with the value of the wastewater work done on the property The connection and monthly fees by category are listed in Exhibit C. A copy of the Wastewater Service Charges Ordinance follows the case study.

The information in this case study was completed in June of 1982 and updated in April of 1983.

EXHIBIT A

DIVISION OF RESPONSIBILITY FOR WAYNESVILLE SAWS MANAGEMENT PROGRAM

TASK	RESPONSIBILITY			
	Public	County	Private	
	Village	Health Dept.	Owner or Developer	Contractor
A. Adopt design standards		M,P		
B. License private sewage disposal contractors		M,P		
C. Perform site feasibility analysis		M,P		(P)
D. Perform percolation tests			M	P
E. Prepare plans & permit application			M	P
F. Review plans & grant permit		M,P		
A. Install system			M	P
B. Inspect system during construction		M,P		
C. Approve system after final inspection		M,P		
D. Prepare & submit as-built plans			M	P
A. Inspect septic tanks	M,P			
B. Pump septic tanks	M			P
C. Disposal of septage	M			P
D. Keep records of construction and maintenance	M,P			
E. Sample & test groundwater quality	M			P
F. Maintain sand filter pumps and	M,P			
G. Maintain cluster systems	M,P			(P)
H. Repair or replace on-site systems as necessary	M,P			
I. Adopt & administer wastewater disposal ordinance	M,P			
J. Adopt & administer user charge system	M,P			

NOTE: M = Manage
P = Perform

SOURCE: "Facilities Plan for the Village of Waynesville DeWitt County, Illinois, February 1, 1980, Architectural and Engineering Service Corporation, pg. 84.

Exhibit B

ESTIMATED REVENUE REQUIREMENTS FOR THE WAYNESVILLE CONSTRUCTION AND MANAGEMENT PROGRAM

Construction

EPA Grant	$518,500		
Local Share	97,500	Cash from Village	$23,000
		FmHA Loan	70,000
Total Construction Costs	$616,000		

Management

Annual Loan Payment	$ 6,000*
O & M Costs	8,200
Replacement Costs	6,800
Reserve	600**
Total Annual Revenue Requirements	$ 21,600
Monthly Revenue Requirement	$ 1,800

Notes:

*20 year repayment at 5% interest.

**The 10% reserve is a condition of the FmHA loan. Upon closing the loan, the village is required to set up two reserve accounts, each receiving 50% of the reserve funds. One account is a bond and interest reserve that will accumulate to a minimum of the annual principal and interest payment on the loan. The other account is called a depreciation account. Funds from the depreciation account can be used for unusual equipment repair, replacement or other costs related to capital investments.

SOURCE: "Facilities Plan for the Village of Waynesville, DeWitt County, Illinois", February, 1980. Architectural and Engineering Service Corp., pg. 91.

Exhibit C

USER CHARGE SYSTEM
WAYNESVILLE SAWS MANAGEMENT DISTRICT

	Method 1			Method 2		
	Connection Fee	Monthly Fees		Connection Fee	Monthly Fee	
Category of System		O&M	Debt Service		O&M	Debt Service
Systems requiring no action or rehabilitation	30.00	5.12	0.50	70.00	5.12	--
Soil absorption systems, sand filters, or connections to clusters using existing septic tanks	75.00	5.12	1.48	300.00	5.12	--
Soil absorption systems, sand filters, or connections to clusters where septic tank must be replaced	100.00	5.12	2.63	500.00	5.12	--
Laundromat	300.00	18.72	4.28	3,000.00	18.72	--
School	300.00	18.50	4.50	3,000.00	18.50	--

Source: Waynesville, Illinois Wastewater Service Charges Ordinance. Chapter 19.005. Adopted October 4, 1982.

CHAPTER 19.004

SEWER USE ORDINANCE

AND

CHAPTER 19.005

WASTEWATER SERVICE CHARGES ORDINANCE

FOR

VILLAGE OF WAYNESVILLE, ILLINOIS

PREPARED BY;

ARCHITECTURAL AND ENGINEERING
SERVICE CORPORATION
142 EAST PRAIRIE AVENUE
DECATUR, ILLINOIS 62523

AN ORDINANCE REGULATING: THE USE OF PUBLIC AND PRIVATE SEWERS AND DRAINS, PRIVATE SEWAGE DISPOSAL, THE INSTALLATION AND CONNECTION OF BUILDING SEWERS, THE DISCHARGE OF WATERS AND WASTES INTO THE PUBLIC SEWER SYSTEM, AND PROVIDING PENALTIES FOR VIOLATIONS THEREOF; AN ORDINANCE LEVYING: CHARGES FOR WASTEWATER SERVICES (USER CHARGES);

IN THE VILLAGE OF WAYNESVILLE, COUNTY OF DE WITT, STATE OF ILLINOIS.

BE IT ORDAINED AND ENACTED BY THE BOARD OF TRUSTEES OF THE VILLAGE OF WAYNESVILLE, STATE OF ILLINOIS, AS FOLLOWS:

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CHAPTER 19.004

SEWER USE ORDINANCE

ARTICLE I

USE OF PUBLIC SEWERS REQUIRED

1.01 Deposits of Objectionable Waste

It shall be unlawful for any person to place, deposit, or permit to be deposited in any unsanitary manner on public or private property within the Village of Waynesville, or in any area under the jurisdiction of said Village, any human or animal excrement, garbage or other objectionable waste.

1.02 Treatment Required

It shall be unlawful to discharge to any natural outlet within the Village of Waynesville, or in any area under the jurisdiction of said Village, any sewage or other polluted waters, except where suitable treatment has been provided in accordance with subsequent provisions of this Ordinance.

1.03 Privy, Cesspool

It shall be unlawful to construct or maintain any privy, privy vault, cesspool or other facility intended or used for the disposal of sewage.

1.04 On-Site Waste Disposal System is Required

The owner of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes situated within the Village and abutting on any street, alley, or right-of-way;

(a) in which any public (small diameter) sanitary sewer of the Village is located, is hereby required, at his expense, to install suitable toilet facilities therein and on-site waste disposal system of septic tank, and then to connect such facilities directly with the proper public sewer in accordance with the provisions of this Ordinance upon official notice to do so, provided that said public sewer is within 100 feet (30.5 meters) of the property line;

(b) in which any public sanitary sewer of the Village will not be available, is hereby required, at his expense, to install suitable toilet facilities therein and on-site waste disposal system consisting of septic tank and approved disposal facility in accordance with provisions of this Ordinance upon official notice to do so.

ARTICLE II

PRIVATE SEWAGE DISPOSAL

2.01 Septic Tank

Where a public sanitary sewer is not available under the provisions of Article I, Section 1.04(a), the building sewer shall be connected to a private sewage disposal system of septic tank and disposal facility, complying with the provisions of this Article II.

2.02 Construction Permit and Inspection Fee

Before commencement of construction of a private sewage disposal system, the owner shall first obtain a written permit signed by the Health Officer for the DeWitt County Health Department. The application for such permit shall be made on a form furnished by the Village (reference Appendix #2), which the applicant shall supplement by any plans, specifications and other information as are deemed necessary by the Village and County Health Officer. A permit and inspection fee as adopted by the DeWitt County Health Department shall be paid to the DeWitt County Health Department at the time the application is filed.

2.03 Construction Inspection

A permit for a private sewage disposal system shall not become effective until the installation is completed to the satisfaction of the Village and County Health Officer. They shall be allowed to inspect the work at any stage of construction and, in any event, the applicant for the permit shall notify the Health Officer when the work is ready for final inspection and before any underground portions are covered. The inspection shall be made within 48 hours of the receipt of written notice by the Health Officer (Saturday, Sunday and legal holidays excluded).

2.04 Code Requirements

The type, capacities, location and layout of a private sewage disposal system shall comply with all recommendations of the State of Illinois Private Sewage Disposal Licensing Act and Code and with the State of Illinois Environmental Protection Agency. No permit shall be issued for any private sewage disposal system employing subsurface soil absorption facilities where the area of the lot is less than 6,000 square feet (557.42 square meters). No sewage disposal facility shall be permitted to discharge to any natural outlet.

2.05 Sewer Connection

At such time as a public sewer becomes available to a property served by a private sewage disposal system, as provided in Article I, Section 1.04(a), a connection from any septic tanks shall be made to the public sewer in compliance with this Ordinance.

2.06 Operation and Maintenace

Following approval of the completed private sewage disposal system by the Health Officer, the Village shall operate and maintain said system in accordance with the procedures adopted within the Village Wastewater Disposal Zone Ordinance.

2.07 Health Officer Requirements

No statement contained in this Article shall be construed to interfere with any additional requirements that may be imposed by the DeWitt County Health Officer, Illinois Environmental Protection Agency or Illinois Department of Public Health.

ARTICLE III

BUILDING SEWERS AND CONNECTIONS

3.01 Permit Required for Sewer Connection

No unauthorized person shall uncover; make any connections with or opening into; use; alter or disturb any public sewer, appurtenance or on-site system thereof without first obtaining a written permit from the DeWitt County Health Officer.

3.02 Standards for Discharge

All disposal by any person into the sewer system is unlawful, except those discharges in compliance with Federal Standards promulgated pursuant to the Federal Act and more stringent State and Local standards.

3.03 Classes of Permit and Fees

There shall be one (1) class of building sewer permit for residential and commercial service. The owner or his agent shall make application on a special form furnished by the DeWitt County Health Department (reference Appendix #2). The permit application shall be supplemented by any plans, specifications or other information considered pertinent in the judgment of the Village and DeWitt County Health Officer. A permit and inspection fee as adopted by the DeWitt County Health Department shall be paid at the time the application is filed.

3.04 Permit Subject to System Capacity

A permit for a building sewer followed only by septic tank and appurtenances will be issued and a sewer connection allowed, if it can be demonstrated that the downstream sewerage facilities, including sewers, pump stations and wastewater treatment facilities, have sufficient reserve capacity to adequately and efficiently handle the additional anticipated waste load.

3.05 Installation Costs

All costs and expense incident to the installation and connection of the building sewer on-site wastewater system shall be borne by the owner. The owner shall indemnify the Village from any loss or damage that may directly or indirectly be occasioned by the installation.

3.06 Separate Connection Required

A separate and independent building sewer and approved on-site disposal facility shall be provided for every building, except that where one building stands at the rear of another on an interior lot, and no private sewer is available or can be constructed to the rear building through an adjoining alley, court, yard, or driveway, the building sewer from the front building may be extended to the rear building and the whole considered as one building sewer and on-site disposal facility, provided all improvements are owned by one owner.

3.07 Existing Building Sewers and Disposal Facilities

Old building sewers and disposal facilities may be used in connection with new buildings only when they are found, upon examination and test by the Health Officer to meet all requirements of this Ordinance.

3.08 Design and Specifications

The size, slope, alignment, materials of construction of a building sewer and septic tank, and the methods to be used in excavating, placing of the pipe, jointing, testing, and backfilling in the trench, shall all conform to the requirements of the building and plumbing code or other applicable rules and regulations of the Village and the DeWitt County Health Department. In the absence of code provisions, or in amplification thereof, the materials and procedures set forth in appropriate specifications of the American Society of Testing Materials, Water Pollution Control Federation Manual of Practice No. 9, and Standard Specifications for Water and Sewer Main Construction in Illinois shall apply.

3.09 Elevations

Whenever possible, the building sewer shall be brought to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, sanitary sewage carried by such building drain shall be lifted by a means which is approved in accordance with Article III, Section 3.02, and discharged to the building sewer.

3.10 Illegal Connections of Roof Downspouts, Etc.

No person(s) shall make connection of roof downspouts, exterior foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building sewer or building drain which, in turn, is connected directly or indirectly to a public sanitary sewer or on-site disposal facilities.

3.11 Code Requirements for Connection to Public Sewer

The connection of the building sewer/septic tank into the public sewer shall conform to the requirements of the building and plumbing code, or other applicable rules and regulations of the Village and DeWitt County Health Department, or the procedures set forth in appropriate specifications of the American Society of Testing Materials, Water Pollution Control Federation Manual of Practice No. 9, and Standard Specifications for Water and Sewer Main Construction in Illinois. All such connections shall be made gas-tight and water-tight. Any deviation from the prescribed procedures and materials must be approved by the Health Officer before installation.

3.12 Inspection by Health Officer

The applicant for the building sewer permit shall notify the Health Officer when the building sewer is ready for inspection and connection to the public disposal facilities. The connection shall be made under the supervision of the Health Officer, or his representative.

3.13 Barricades Required

All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the Village.

ARTICLE IV

USE OF THE PUBLIC SEWERS

4.01 Unallowable Discharges

No person shall discharge, or cause to be discharged, any stormwater, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process waters to any sanitary sewer or on-site disposal facilities.

4.02 Stormwater

Stormwater and all other unpolluted drainage shall be discharged to such storm sewers or to a natural outlet approved by the Health Officer. Industrial cooling water or unpolluted process waters may be discharged on approval of the Health Officer to a storm sewer or natural outlet.

4.03 Prohibited Waters and Wastes

No person shall discharge, or cause to be discharged, any of the following described waters or wastes to any public sewers:

(a) Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas.

(b) Any waters or wastes containing toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in receiving waters.

(c) Any waters or wastes having a pH lower than 5.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works.

(d) Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewer or other interference with the proper operation of the sewage works, such as, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc., either whole or ground by garbage grinders.

4.04 Industrial Waste

No industrial user may discharge sewage into any public sewer until the Village of Waynesville has adopted an industrial cost-recovery system which:

(a) Meets the requirements of Section 204(b)(1)(B) of the Federal Water Pollution Control Act Amendments of 1972 and applicable Federal regulations; and

(b) Has been approved by the Agency in accordance with the conditions of any grant made to the Village of Waynesville by the United States Environmental Protection Agency or by the State of Illinois for the construction of any part of the sewer system or sewage treatment works of the Village of Waynesville.

4.05 Prohibited Substances

No person shall discharge, or cause to be discharged, the following described substances, materials, waters or wastes, if it appears likely, in the opinion of the Health Officer, that such wastes can harm either the sewers, sewage treatment process or equipment; or can endanger life, limb, public property, or constitute a nuisance, or have an adverse effect on receiving stream. In forming his opinion as to the acceptability of these wastes, the Health Officer will give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, degree of treatability of wastes in the sewage treatment plant, or on-site disposal facilities, and maximum limits established by regulatory agencies. The substances prohibited are:

(a) Any liquid or vapor having a temperature higher than one hundred fifty degrees Fahrenheit (150, F.) (65, C.).

(b) Any waters or wastes containing toxic or poisonous materials or oils, whether emulsified or not, in excess of one hundred (100) mg/l, or containing substances which may solidify or become viscous at temperatures between thirty-two degrees and one hundred fifty degrees Fahrenheit (32, F.and 150, F.) (0, C. and 65, C.).

(c) Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with a motor of three-fourths (3/4) horsepower (0.76 HP metric), or greater, shall be subject to the review and approval of the Health Officer.

(d) Any waters or wastes containing strong acid, iron pickling wastes, or concentrated plating solutions, whether neutralized or not.

(e) Any waters or wastes containing iron, chromium, copper, zinc, or similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage exceeds the limits established by the DeWitt County Health Department for such materials.

(f) Any waters or wastes containing phenols or other taste or odor-producing substances, in such concentrations exceeding limits which may be established by the Health Officer as necessary after treatment of the composite sewage, to meet the requirements of the State, Federal or other public agencies of jurisdiction for such discharge to the receiving waters.

(g) Any radioactive wastes for isotopes of such half-life or concentration as may exceed limits established by the Health Officer in compliance with applicable State or Federal regulations.

(h) Any waters or wastes having a pH in excess of 9.5.

(i) Any mercury, or any of its compounds, in excess of 0.0005 mg/l as Hg at any time, except as permitted by the Health Officer in compliance with applicable State and Federal regulations.

(j) Any cyanide in excess of 0.025 mg/l at any time, except as permitted by the Health Officer in compliance with applicable State and Federal regulations.

(k) Materials which exert or cause:

  (1) Unusual concentrations of inert suspended solids (such as, but not limited to, Fullers earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate);

  (2) Excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions);

  (3) Unusual BOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works;

  (4) Unusual volume of flow or concentrations of wastes constituting "slugs" as defined herein.

(l) Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of agencies having jurisdiction over discharge to the receiving waters.

4.06 Alternatives for Prohibited Substances

If any waters or wastes are discharged or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in Section 4.05 of this Article, and/or which are in violation of the standards for pretreatment provided in Chapter 1, EPA Rules and Regulations, subchapter D, Water Programs Part 128 - Pretreatment Standards, Federal Register, Volume 38, No. 215, Thursday, November 8, 1973, and any amendments thereto, and which, in the judgment of the Health Officer, may have a deleterious effect upon the sewage works, processes, equipment or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the Health Officer may:

(a) Reject the wastes;

(b) Require pretreatment to an acceptable condition for discharge to the public sewers;

(c) Require control over the quantities and rates of discharge; and/or

(d) Require payment to cover the added costs of handling and treating the wastes not covered by existing taxes or sewer use charges, under the provisions of Section 4.10 of this Article.

If the Health Officer permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the Health Officer and subject to the requirements of all applicable codes, ordinances and laws.

4.07 Grease, Oil and Sand Interceptors

Grease, oil and sand interceptors shall be provided when, in the opinion of the Health Officer, they are necesary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand or other harmful ingredients, except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the Health Officer and shall be located as to be readily and easily accessible for cleaning and inspection.

4.08 Pretreatment and Flow Equalizing Facilities

Where preliminary treatment or flow-equalizing facilities are provided, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

4.09 Control Manhole for Industry

Each industry shall be required to install a control manhole and, when required by the Health Officer, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole, together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance with plans approved by the Health Officer. The manhole shall be installed by the owner at his expense, and shall be maintained by him so as to be safe and accessible at all times.

4.10 Requirements of Laboratory Tests for Industrial Wastes

The owner of any property serviced by a building sewer carrying industrial wastes shall provide laboratory measurements, tests and analyses of waters and wastes to illustrate compliance with this Ordinance and any special conditions for discharge established by the Village or regulatory agencies having jurisdiction over the discharge. The number, type and frequency of laboratory analyses to be performed by the owner shall be as stipulated by the Village or DeWitt County Health Department, but no less than once per year the industry must supply a complete analysis of the constituents of the wastewater discharge to assure that compliance with the Federal, State and Local standards are being met. The owner shall report the results of measurements and laboratory analyses to the DeWitt County Health Department at such times and in such manner as prescribed by the Village, or its authorized representative. The owner shall bear the expense of all measurements, analyses, and reporting required by the Village. At such times as deemed necessary, the Village reserves the right to take measurements and samples for analysis by an outside laboratory service.

4.11 Methods of Laboratory Tests and Sampling

All measurements, tests and analyses of the characteristics of waters and wastes to which reference is made in this Ordinance shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater," published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb and property. The particular analyses involved will determine whether a twenty-four (24) hour composite of all outfalls of a premise is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from 24-hour composites of all outfalls, whereas pH is determined from periodic grab samples.

4.12 Special Agreement

No statement contained in this Article shall be construed as preventing any special agreement or arrangement between the Village and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the Village for treatment, subject to payment therefor, in accordance with Chapter 19.004, Article I hereof, by the industrial concern, provided such payments are in accordance with Federal and State guidelines for User Charge System.

ARTICLE V

PROTECTION OF SEWAGE WORKS FROM DAMAGE

5.01 Protection

No unauthorized person shall maliciously, willfully, or negligently break, damage, destroy or tamper with any structure, appurtenance or equipment which is a part of the sewage works. Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct.

ARTICLE VI

POWERS AND AUTHORITY OF INSPECTORS

6.01 Authority for Inspection

The Health Officer and other duly authorized employees of the Village, the DeWitt County Health Department, the Illinois Environmental Protection Agency, and the U.S. Environmental Protection Agency, bearing proper credentials and identification, shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling and testing in accordance with the provisions of this Ordinance. The Health Officer, or his representative, shall not have authority to inquire into any processes, including metallurgical, chemical, oil refining, ceramic, paper or other industries, beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterway or facilities for waste treatment.

6.02 Safety Rules and Liability

While performing the necessary work on private properties referred to in Article VI, Section 6.01 above, the Health Officer, or duly authorized employees of the Village, the DeWitt County Health Department, the Illinois Environmental Protection Agency, and the U. S. Environmental Protection Agency shall observe all safety rules applicable to the premises established by the company, and the company shall be held harmless for injury or death to the Village employees, and the Village shall indemnify the company against loss or damage to its property by Village employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions.

6.03 Permit to Enter Private Property

The Health Officer and other duly authorized employees of the Village bearing proper credentials and identification shall be permitted to enter all private properties located within the wastewater disposal zone for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair, and maintenance of any portion of the sewage works lying within said zone. All entry and subsequent work, if any, on said zone shall be done in full accordance with the terms of the zone Ordinance pertaining to the private property involved.

ARTICLE VII

PENALTIES

7.01 Notice

Any person found to be violating provision of this Ordinance, except Article V, shall be served by the Village with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations. The Village or DeWitt County Health Department may revoke any permit for sewage disposal as a result of any violation of any provision of this Ordinance.

7.02 Penalties

Any person who shall continue any violation beyond the time limit provided for in Article VII, Section 7.01, shall be guilty of a misdemeanor and, on conviction thereof, shall be fined in an amount not exceeding Two Hundred and No/100ths Dollars ($200.00) for each violation. Each day in which any such violation shall continue shall be deemed a separate offense.

7.03 Liabilities

Any person violating any of the provisions of this Ordinance shall become liable to the Village by reason of such violation.

ARTICLE VIII

VALIDITY

8.01 Repeal

All Ordinances, or parts of Ordinances, in conflict herewith are hereby repealed.

8.02 Invalidity of Part

The invalidity of any section, clause, sentence or provision of this Ordinance shall not affect the validity of any other part of this Ordinance which can be given effect without such invalid part or parts.

ARTICLE IX

ORDINANCE IN FORCE

9.01 Effective Date

This Ordinance shall be in full force and effect from and after its passage, approval, recording and publication as provided by law.

9.02 Adoption of Ordinance

Passed and adopted by the Village Board of the Village of Waynesville, State of Illinois, on the 4 day of October, 19 82, by the following vote:

Ayes 4: Namely: Isaac, Fletcher, McGowan, Garre

Nays 0: Namely: ______

Approved this 4 day of October, 19 82.

(Signed) Gary L. Leifer

ATTEST:

(Signed) Virginia Halsey

ADDENDUM TO SEWER USE ORDINANCE

The standard sewer use ordinance provided by the Environmental Protection Agency will be adopted by entities receiving EPA and Farmers Home Administration assistance to finance sanitary sewer systems. In addition, an ordinance containing the following provisions will be adopted:

Extension of Mains:

A. Determination of Who Pays Expense of Extension. The Board of (Trustees) (Directors) shall first determine if an extension of a sewer main is economically feasible based on the estimated cost of the extension and the number of existing potential users that will be served by the extension. If the extension is economically feasible then the (Village) (District) (Corporation) may install and pay the cost of the extension at the discretion of the Board of (Trustees) (Directors). If the (Village) (District) (Corporation) elects not to pay the cost of extending the sewer main then the person or persons desiring sewer service shall install the extension at their own personal expense upon written consent by the Board of (Trustees) (Directors). The (Village) (District) (Corporation) shall not pay for any extensions to an undeveloped area such as a subdivision being developed unless there are sufficient existing residents or businesses to make the extension economically feasible.

B. Requirements if Extension is Installed by Someone Other than the (Village) (District) (Corporation).

(1) The (Village) (District) (Corporation) must approve all plans and specifications for any extensions.
(2) Before any extensions are installed, the plans and specifications must be reviewed and approved by the State of Illinois, Environmental Protection Agency.
(3) Ownership, rights-of-way, and title must be conveyed to the (Village) (District) (Corporation) for all extensions installed by anyone other than the (Village) (District) (Corporation). The (Village) (District) (Corporation) will maintain the mains thereafter.
(4) No extension will be permitted if in the opinion of the Board of (Trustees) (Directors), the system does not have the necessary capacity to serve the proposed extension.

Change in Occupancy:

A. Notice to (Village) (District) (Corporation). Any (member) (user) requesting a termination of service shall give written notice to the (Village) (District) (Corporation) ten (10) days prior to the time such termination of service is desired.

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B. Responsibility for Payment of Services Already Consumed. Responsibility for payment for sewer service prior to the date of termination shall be with the property owners as well as the (member) (user).

C. Charges for Change. There shall be no charge for transferring the sewer service to the subsequent (member) (user).

Passed by the Board of (Trustees) (Directors) this 4 day of October, 19 82.

Gary L. Seyfer
President

(SEAL)

Virginia Halsey
(Secretary) (Clerk)

o O o

Legal # 4137
Oct 14

CHAPTER 19.005

WASTEWATER SERVICE CHARGES ORDINANCE

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Addendum - Illinois Instruction 1942-A A Guide 5A (05-23-79) PN671

ADDENDUM TO SEWER USE ORDINANCE

CHAPTER 19.005

WASTEWATER SERVICE CHARGES ORDINANCE

ARTICLE I

1.01 Basis for Wastewater Service Charges

The wastewater service charge for the use of and service supplied by the wastewater facilities of the Village shall consist of a basic user charge for operation and maintenance, plus replacement, a debt service charge and a surcharge, if applicable.

The debt service charge shall be determined by the amount of rehabilitation required to construct each sanitary facility to meet all current governmental standards and codes. These charges will be included in the rates adopted in ARTICLE I, Section 1.03.

The basic user charge shall be based on the following:

(a) The wastewater disposal fee, hereinafter called "connection fee," is determined by the category of service and method of payment:

(1) Method #1: Property owner agrees to pay lower connection fee and pay a larger monthly fee to retire debt service.

(2) Method #2: Property owner agrees to pay larger connection fee and a lower monthly fee toward debt service.

(b) The continuing monthly charge shall be based on connection fee, category of service and method of payment, requirements to keep current with State of Illinois Private Sewage Disposal Licensing Act and Code, and all applicable standards required by the Illinois Environmental Protection Agency. It shall consist of operation and maintenance costs, plus replacement costs, and shall be computed as follows:

(1) Systems requiring no action (A), or rehabilitation only (B).

(2) Soil Absorption Systems (C), or Sand Filters (E), or Connections to Cluster System where existing Septic Tank is acceptable.

(3) Soil Absorption System (D), or Sand Filters (F), or Connections to Cluster System where existing Septic Tank must be replaced.

(4) Large Water Users (over 800 gallons of water used per day) Limited to Public Grade School and Laundromat only.

(5) Nonresidential Users having wastes greater than domestic waste as defined in Section 1.04 of Definitions.

The adequacy of the wastewater service charge shall be reviewed annually by Certified Public Accountants for the Village in their annual audit report. The wastewater service charge shall be revised periodically to reflect a change in debt service or a change in operation and maintenance costs, including replacement costs.

c. The rate for any waste disposal systems required and constructed in accordance with the Village Sewer Use Ordinance after Oct 4, 1982, shall be the rate then in effect for operation, maintenance and replacement for all other users in the classification of service required by the nature of the system constructed.

1.02 Measurement of Flow

The volume of flow used for computing surcharges shall be the metered water consumption read to the lowest even increments of 10 gallons.

(a) If the person discharging wastes into the public sewers procures any part, or all, of his water from sources other than the Public Waterworks System, all or a part of which is discharged into the public sewers, the person shall install and maintain, at his expense, water meters of a type approved by the Village for the purpose of determining the volume of water obtained from these other sources.

(b) Devices for measuring the volume of waste discharged may be required by the Village, if these volumes cannot otherwise be determined from the metered water consumption records.

(c) Metering devices for determining the volume of waste shall be installed, owned, and maintained by the person. Following approval and installation, such meters may not be removed, unless service is canceled, without the consent of the Village.

1.03 Debt Service Charge and Basic User Rates

There shall be, and there is hereby established, a debt service charge and basic user rate for the use of and for services supplied by the Wastewater Facilities of the Village.

The following monthly rates shall apply:

	METHOD #1			METHOD #2		
CATEGORY	Wastewater Disposal Fee	Monthly Charge OM&R	Monthly Charge Debt	Wastewater Disposal Fee	Monthly Charge OM&R	Monthly Charge Debt
Systems Requiring No Action (A) or Rehabilitation (B)	30.00	5.12	0.50	70.00	5.12	-0-
Soil Absorption Systems (C), or Sand Filters (E), or Connections to Cluster where Existing Septic Tank is Acceptable	75.00	5.12	1.48	300.00	5.12	-0-
Soil Absorption Systems (D), or Sand Filters (F), or Connections to Cluster where Existing Septic Tank must be Replaced	100.00	5.12	2.63	500.00	5.12	-0-
Laundromat	300.00	18.72	4.28	3,000.00	18.72	-0-
School	300.00	18.50	4.50	3,000.00	18.50	-0-

1.04 Surcharge Rate

The rates of surcharges for BOD_5 and SS shall be as follows:

(To be determined by the Village when the circumstances arise.)

1.05 Computation of Surcharge

The concentration of wastes used for computing surcharges shall be established by waste sampling. Waste sampling shall be performed as often as may be deemed necessary by the Village and shall be binding as a basis for surcharges.

1.06 Computation of Wastewater Service Surcharge

The wastewater service surcharge shall be computed by the following formula:

*CW = CD + CM + CS

*CW = Amount of wastewater service charge ($)
CD = Debt Service Charge (Section 1.03)
CM = Charge for Operation, Maintenance and Replacement (Section 1.03)
CS = Amount of Surcharge (Sections 1.04 and 1.05)

ARTICLE II

GENERAL PROVISIONS

2.01 Bills

Said rates or charges for service shall be payable monthly, depending on the classification of sewer service for which bills are rendered. The owner of the premises, the occupant thereof, and the user of the sewer service shall be jointly and severally liable to pay for the service to such premises, and the service is furnished to the premises by the Village only upon the condition that the owner of the premises, occupant and user of the sewer services are jointly and severally liable therefor to the Village.

Bills for sewer service shall be sent out by the Village Treasurer on the twelfth day of the month succeeding the period for which the service is billed.

All sewer bills are due and payable fifteen (15) days after being sent out. A penalty of ten percent (10%) shall be added to all bills not paid by the 15th day after they have been rendered.

2.02 Delinquent Bills

If the charges for such sewer services are not paid within 45 days, or 30 days herein abovementioned after the rendition of the bill for such services, sewer and water services shall be discontinued without further notice and shall not be reinstated until all claims are settled.

2.03 Lien - Notice of Delinquency

Whenever a bill for sewer service remains unpaid for forty-five (45) days for monthly service after it has been rendered, the Village Treasurer shall file with the County Recorder of Deeds a statement of lien claim. This statement shall contain the legal description of the premises serviced, the amount of the unpaid bill, and a notice that the Village claims a lien for this amount, as well as for all charges subsequent to the period covered by the bill.

If the user whose bill is unpaid is not the owner of the premises, and the Village Treasurer has notice of this, notice shall be mailed to the owner of the premises, if his address be known to the Treasurer, whenever such bill remains unpaid for the period of forty-five (45) days for a monthly bill after it has been rendered.

The failure of the Village Treasurer to record such lien or to mail such notice, or the failure of the owner to receive such notice shall not affect the right to foreclose the lien for unpaid bills as mentioned in the foregoing Section.

2.04 Foreclosure of Lien

Property subject to a lien for unpaid charges shall be sold for nonpayment of the same, and the proceeds of the sale shall be applied to pay the charges after deducting costs, as is the case in the foreclosure of statutory liens. Such foreclosure shall be by bill-in-equity in the name of the Village. The Village attorney is hereby authorized and directed to institute such proceedings in the name of the Village in any Court having jurisdiction over such matters against any property for which the bill has remained unpaid forty-five (45) days in the case of a monthly bill after it has been rendered.

2.05 Revenues

All revenues and moneys derived from the operation of the sewerage system shall be deposited in the sewerage account of the sewerage fund. All such revenues and moneys shall be held by the Village Treasurer separate and apart from all other funds of the Village, and all of said sum, without any deductions whatsoever, shall be delivered to the Village Treasurer not more than ten (10) days after receipt of the same, or at such more frequent intervals as may, from time to time, be directed by the President and Board of Trustees.

The Village Treasurer shall receive all such revenues from the sewerage system and all other funds and moneys incident to the operation of such system, as the same may be delivered to him, and deposit the same in the account of the fund designated as the "Sewerage Fund of the Village." Said Treasurer shall administer such fund in every respect in the power provided by statute of the "Revised Cities and Villages Act," effective January, 1942.

2.06 Accounts

The Village Treasurer shall establish a proper system of accounts and shall keep proper books, records and accounts in which complete and correct entries shall be made of all transactions relative to the sewerage system, and at regular annual intervals, he shall cause to be made an audit by an independent auditing concern of the books to show the receipts and disbursements of the sewerage system.

In addition to the customary operating statements, the annual audit report shall also reflect the revenues and operating expenses of the wastewater facilities, including a replacement cost, to indicate that sewer service charges under the waste cost recovery system do, in fact, meet these regulations. In this regard, the financial information to be shown in the audit report shall include the following:

1. A list of all operating, maintenance and replacement costs accumulated during each fiscal year.
2. Billing date to show total number of each rate category billed.
3. Debt service for the next succeeding fiscal year.
4. Number of users connected to the system.
5. Number of delinquent users.
6. A list of users discharging nondomestic wastes (commercial-industrial users) and volume of waste discharged.

2.07 Notice of Rates

A copy of this Article properly certified by the Village Treasurer shall be filed in the Office of the Recorder of Deeds of DeWitt County and shall be deemed notice to all owners of real estate of the charges of the sewerage system of said Village on their properties.

2.08 Penalty

Any person, firm or corporation violating any provisions of this Article shall be fined not less than One Hundred and No/100ths Dollars ($100.00), nor more than One Thousand and No/100ths Dollars ($1,000.00).

2.09 Access to Records

The Illinois Environmental Protection Agency, or its authorized representative, shall have access to any books, documents, papers and records of the Village which are applicable to the Village system of user charges for the purpose of making audit, examination, excerpts and transcriptions thereof to insure compliance with the terms of the Special and General Conditions to any Federal/State Grant.

ARTICLE III

EFFECTIVE DATE OF RATES

The rates and service charges established for user charges in Article I, Section 1.03 through Section 1.07 of this Chapter shall be effective at the time of inspection and rehabilitation of individual septic systems or connection to the cluster system is completed. Bills shall be rendered for user charges beginning on the next succeeding month.

ARTICLE IV

VALIDITY

That, if any section, paragraph, clause or provision of this Ordinance shall be held to be invalid or unenforceable for any reason, the invalidity or unenforceability of such section, paragraph, clause or provision shall not affect any of the remaining provisions of this Ordinance.

ARTICLE V

ORDINANCE IN FORCE

This Ordinance shall be in full force and effect from and after its passage and approval and publication as provided by law.

Passed by the Village Board of the Village of Waynesville,
Illinois, on the 4 day of October, 1982.

(Signed) Gary L Leifer
Village President

ATTEST:

(Signed) Virginia Halsey
Village Clerk

APPENDIX #1

DEFINITIONS

Definitions

Unless the context specifically indicates otherwise, the meaning of terms used in these Ordinances shall be as follows:

Chapter 19.004 - SEWER USE ORDINANCE

Section 1.01 "Person" shall mean any and all persons, natural or artificial, including any individual, firm, company, municipal or private corporation, association, society, institution, enterprise, governmental agency or other entity.

Section 1.02 "Natural Outlet" shall mean any outlet into a watercourse, pond, ditch, lake or other body of surface or groundwater.

Section 1.03 "Septic Tank" is a device designed and constructed for partial treatment of normal domestic waste by physical or mechanical means to reduce BOD and SS within limitations as described in Section 1.04 below.

Section 1.04 "Combined Sewer" shall mean a sewer which is designed and intended to receive wastewater storm, surface and groundwater drainage.

"NPDES Permit" means any permit or equivalent document or requirements issued by the Administrator or, where appropriated by Water Pollution Control Amendments of 1972, to regulate the discharge of pollutants pursuant to Section 402 of the Federal Act.

"Normal Domestic Sewage" means waste not greater than a five-day, 20-degree Centigrade (20), biochemical oxygen demand (BOD) of 100 mg/1 or a suspended solids (SS) content of 120 mg/l.

"Sewer" shall mean a pipe or conduit for conveying sewage or any other waste liquids, including stormwater, surface water and groundwater drainage.

"Public Sewer" shall mean a sewer provided by or subject to the jurisdiction of the Village. It shall also include sewers within or outside the Village boundaries that serve one or more persons and ultimately discharge into the Village sanitary (or combined) sewer system, even though those sewers may not have been constructed with Village funds.

"Sanitary Sewer" shall mean a sewer that conveys sewage or industrial wastes, or a combination of both, and into which stormwater, surface water and groundwater or unpolluted industrial wastes are not intentionally admitted.

"On-Site Disposal Facilities" shall mean a system which is designed and intended to receive and treat wastewater within the boundaries of each individual site.

Section 2.06

"Wastewater Disposal Zone" means an area designated by the Village in Ordinance to form a wastewater disposal zone "to protect the public health, to prevent and abate nuisances, to protect existing and future beneficial water use, to achieve compliance with regulations of the Pollution Control Board, and to achieve compliance with any other statutes or requirements regarding public health or environmental protection."

"Building Sewer" shall mean the extension from the building drain to the septic tank or other place of disposal.

Section 3.02

"Federal Act" means the Federal Water Pollution Control Act (33 U.S.C. 1251, et seq.) as amended by the Federal Water Pollution Control Act of Amendments of 1972 (Pub. L. 92-500) and (Pub. L. 93-243).

Section 3.04

"Sewerage" shall mean the system of sewers and appurtenances for the collection, transportation and pumping of sewage.

"Wastewater Treatment Works" shall mean an arrangement of devices and structures for treating wastewater, industrial wastes and sludge.Sometimes used synonymously with "waste treatment plant" or "wastewater treatment plant" or "pollution control plant" or "mound system."

"Wastewater Facilities" shall mean the structures, equipment and processes required to collect, carry away, and treat domestic and industrial wastes and transport effluent to a watercourse.

Section 3.09

"Building Drain" shall mean that part of the lowest piping of a drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building and conveys it to the building sewer or other approved point of discharge, begining five (5) feet (1.5 meters) outside the inner face of the building wall.

Section 4.02

"Storm Sewer" shall mean a sewer that carries stormwater, surface water and groundwater drainage, but excludes sewage and industrial wastes, other than unpolluted cooling water.

"Stormwater Runoff" shall mean that portion of the precipitation that is drained into the sewers.

Section 4.05

"Wastewater" shall mean the spent water of a community. From this standpoint, of course, it may be a combination of the liquid and water-carried wastes from residences, commercial buildings, industrial plants and institutions, together with any groundwater, surface water and stormwater that may be present.

"Sewage" is used interchangeably with "wastewater."

"Effluent Criteria" are defined in any applicable "NPDES Permit."

"Water Quality Standards" are defined in the Water Pollution Regulations of Illinois.

"Unpolluted Water" is water of quality equal to or better than the effluent criteria in effect, or water that would not cause violation of receiving water quality standards and would not be benefited by discharge to the sanitary sewers and wastewater treatment facilities provided.

"ppm" shall mean parts per million by weight.

"Milligrams per Liter" shall mean a unit of the concentration of water or wastewater constituent. It is 0.001 g of the constituent in 1000 ml of water. It has replaced the unit formerly used commonly, parts per million, to which it is approximately equivalent, in reporting the results of water and wastewater analysis.

"Suspended Solids" shall mean solids that either float on the surface of, or are in suspension in water, sewage, or industrial waste and which are removable by a laboratory filtration device. Quantitative determination of suspended solids shall be made in accordance with procedures set forth in "Standard Methods."

"BOD" (denoting Biochemical Oxygen Demand) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standards laboratory procedure in five (5) days at 20, C., expressed in milligrams per liter.

"pH" shall mean the logarithm (base 10) of the reciprocal of the hydrogen-ion concentration expressed by one of the procedures outlined in "Standard Methods."

"Standard Methods" shall mean the examination and analytical procedures set forth in the most recent edition of "Standard Methods for the Examination of Water and Wastewater" published jointly by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation.

"Garbage" shall mean solid wastes from the domestic and commercial preparation, cooking and dispensing of food and from the handling, storage and sale of produce.

"Properly Shredded Garbage" shall mean the wastes from the preparation, cooking and dispensing of food that has been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch (1/2") (1.27 centimeters)in any dimension.

"Floatable Oil" is oil, fat or grease in a physical state such that it will separate by gravity from wastewater by treatment in an approved pretreatment facility. A wastewater shall be considered free of floatable fat if it is properly pretreated and the wastewater does not interfere with the collection system.

"Population Equivalent" is a term used to evaluate the impact of industrial or other waste on a treatment works or stream. One population equivalent is 100 gallons of sewage per day, containing 0.17 pounds of BOD and 0.20 pounds of suspended solids.

"Slug" shall mean any discharge of water, sewage or industrial waste which, in concentration of any given constituent or in quantity of flow, exceeds for any period of duration longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration or flows during normal operation.

Section 4.08 "Pretreatment" shall mean the treatment of wastewaters from sources before introduction into the wastewater treatment works.

Section 4.09 "Control Manhole" shall mean a structure located on a site from which industrial wastes are discharged. Where feasible, the manhole shall have an interior drop. The purpose of a "control manhole" is to provide access for the Village representative to sample and/or measure discharges.

Section 4.10 "Industrial Waste" shall mean any solid, liquid or gaseous substance discharged, permitted to flow or escaping from any industrial, manufacturing, commercial or business establishment or process or from the development, recovery or processing of any natural resource as distinct from sanitary sewage.

All Sections Clarification of Word Usage: "Shall" is mandatory; "may" is permissible.

"Ordinance" means these Ordinances.

"Village" means the Village of Waynesville, Illinois

Chapter 19.005 - WASTEWATER SERVICE CHARGES ORDINANCE

Section 1.01 "User Class" shall mean the type of user, either "residential or commercial," (nonindustrial) or "industrial" as defined herein.

"Residential or Commercial" or "Nonindustrial" user shall mean any user of the treatment works not classified as an industrial user or excluded as an industrial user as provided for in this Section.

"Industrial User" shall mean any nongovernmental user of publicly owned treatment works identified in the Standard Industrial Classification Manual, 1972, Office of Management and Budget, as amended and supplemented, under the following divisions:

(a) Division A - Agriculture, Forestry and Fishing
(b) Division B - Mining
(c) Division D - Manufacturing
(d) Division E - Transportation, Communications, Electric, Gas and Sanitary Services
(e) Division I - Services

A user listed in the Divisions listed shall be excluded, if it is determined by the Health Officer that it will introduce primarily segregated domestic waste or wastes from sanitary conveniences.

"Wastewater Service Charge" shall be the charge per quarter or month levied on all users of the Wastewater Facilities. The service charge shall be computed as outlined in Chapter 19.005, Article I, and shall consists of the total or the Basic User Charge, the Debt Service Charge and a Surcharge, if applicable.

"User Charge" shall mean a charge levied on users of treatment works for the cost of operation and maintenance.

"Basic User Charge" shall mean the basic assessment levied on all users of the public sewer system.

"Debt Service Charge" shall be the amount to be paid each billing period for payment of interest, principal and coverage of (loan, bond, etc.) outstanding and shall be determined by the amount of rehabilitation required to construct each sanitary facility to meet all current governmental standards and codes.

"Replacement" shall mean expenditures for obtaining and installing equipment, accessories, or appurtenances which are necessary during the service life of the treatment works to maintain the capacity and performance for which such works were designed and constructed. The term, "Operation and maintenance," includes replacement.

Section 1.04 "Surcharge" shall mean the assessment, in addition to the Basic User Charge and Debt Service Charge, which is levied on those persons whose wastes are greater in strength than the concentration values established in Chapter 19.005, Article I.

Section 2.05 "Sewerage Fund" is the principal accounting designation for all revenues received in the operation of the sewerage system.

Legal #4138
Oct 14

Rome City, Indiana

COMMUNITY STATISTICS

Name:	Rome City, Indiana
Location:	Northeast, Indiana, about 150-200 miles due east of Chicago
Population:	1980 winter--1,320 Summer--1,870 increase due to lakeside location.
Technology:	Grinder pumps, gravity sewers and tertiary treatment lagoon
Contacts:	Jerry Warrner Town Engineer Rome City, Indiana (219) 854-2412 John O'Malia Snell Environmental Group Lansing, Michigan 48906 (517) 374-6800
Status:	System in operation since 1976

WATER QUALITY BACKGROUND

The Problem

Rome City has about 120 year round households plus about 500 summer cottages surrounding a large lake. The terrain in this area consists of gravel beds sloping towards the lake. Seepage of untreated effluent into the lake was causing pollution problems that affected the fish population and the safety of using the lake for swimming.

The Solution

Rome City hired the Snell Environmental Group to design a wastewater system for the community. The system serves both the lakefront cottages and the central part of town. The design called for 79 grinder stations to be constructed on private property around the lake serving 4 to 6 residences per station. Effluent and solids are pumped from the grinder stations up to gravity sewers running along the road behind the cottages. Wastewater flow is maintained by 23 electric pump stations around the lake. The central part of town is served entirely by gravity sewers. All the sewers flow into a 450,000 gpd oxygen induced lagoon that provides tertiary treatment. Current flows average 100,000 gpd. Over $5 million was raised for the project through a combination of EPA Construction Grants and a FmHA loan. The grinder stations were not eligible for EPA funds because they are located on private property. (The public property requirement has since been changed by EPA.)

WASTEWATER MANAGEMENT

Past Practices

Prior to sewering, wastewater in Rome City was treated through septic tanks, old barrels and inadequate leach beds around the lake and in the central part of town.

Legal Responsibilities

Indiana State Pollution Control Board - has control over the quality of effluents entering public waters.

Indiana State Department of Health - monitors the operation of sewage treatment plants.

Rome City Town Board - controls tap-ins to the city sewer system.

Current Practices

The town of Rome City owns and manages the local sewer system through the Sewer Department.

Management Responsibilities

All system maintenance is done by the Rome City Sewer Department on both a routine and an as needed basis.

Staffing

The Sewer Department employs 3 men to operate the POTW and maintain the grinder pumps, lift stations and gravity sewers. One of the men was the construction inspector for Snell Engineers when the system was built. City CETA employees have been used to undertake general maintenance - other helpers will be found with the discontinuation of this program.

Finances

Debt service and all maintenance and repair fees are covered by a user fee system. The residences in Rome City, both seasonal and year round, are all assessed a base fee of $9.00 a month. Duplexes are charged $18.00 a month. Businesses are charged special rates based on the size of the property, the number of seats for restaurants and other criteria. The connection fee for new residences is $475.00.

The information in this case study was compiled in June of 1982.

Pueblo, Colorado

COMMUNITY STATISTICS		
	Name:	Pueblo County Septic Tank Maintenance Demonstration Project
	Location:	St. Charles Mesa area of Pueblo County
	Technology:	Septic tanks, 240 in study area, 91 original participants in 4 year project, 84 in final year
	Contacts:	Mark Gebhart Pueblo Regional Planning Commission Pueblo Area Council of Governments Pueblo, CO 81003 (303) 543-6006
	Status:	4 year demonstration project complete (1979-1982)

WATER QUALITY BACKGROUND

The Problem

In 1977 the Pueblo County 208 Water Quality Management Plan was completed documenting areas of surface and ground water contamination from wastewater. Areas within Pueblo County had independently been identified by the Colorado State Health Department according to their suitability for on-site wastewater treatment. These areas were listed in order of priority for corrective action in the 208 plan and the St. Charles Mesa area was designated as an area for septic system management.

The Solution

According to the recommendations of the Pueblo 208 Water Quality Management Plan, in late 1978 the Pueblo Regional Planning Commission (PRPC) initiated a small scale demonstration management project in St. Charles Mesa. Financed through EPA 208 funds and administered by PRPC, this four year program was designed to show that septic tank management can be an environmentally sound, technologically feasible and cost-effective alternative to central sewering. The project consists of inspection, maintenance and cleaning of systems, recommendations for repairs and replacement, yearly measurement of sludge depth, liquid depth and scum build-up, and bi-monthly monitoring of groundwater at 8 locations. Of 240 homes in the study area, 91 volunteered to participate in the program after receiving informational materials and attending a public meeting. Participants signed agreements allowing access to their septic tanks for inspection and cleaning and completed a background survey on their septic systems (Exhibit A). A questionnaire sent to participants after the first year of the program showed continued support for the program and a need for more information. This questionnaire was updated in 1982 to track pumping and repairs done outside of the demonstration project. This also helped identify the disposal of home-canning wastes as a contributor to solids accumulation.

WASTEWATER MANAGEMENT

Legal Responsibilities

The responsibility for regulating on-site systems in Colorado is shared by the State Department of Health, Water Quality Control Commission and the local boards of health. Minimum criteria for local regulation of these systems are set forth in the Colorado State Statute. The local boards of health set requirements for system design and installation. Homeowners are responsible for management of their on-site systems.

Management Responsibilities

Pueblo Regional Planning Commission (PRPC) administers the maintenance program, writes summary reports and maintenance procedures, and performs record keeping. PRPC is also responsible for locating and inspecting septic tanks, installing risers, and restoring work area. Additionally, PRPC manages a public participation program incuding a septic tank maintenance display, and booklet answering frequently asked questions with diagrams and worksheets.

A commercial cleaning firm is contracted yearly by PRPC, initially to pump all 91 septic tanks, and to pump tanks as necessary in following years.

City-County Health Department is contracted by PRPC for bi-monthly collection and analysis of water samples.

Staffing

In 1979 the management program administered by PRPC consisted of a project coordinator, two field assistants and a part-time secretary. The field assistants who performed duties related to the initial surveying of septic tanks are no longer being used. In 1980, the inspections were conducted by a commercial septic tank pumping firm; in 1981, by a PRPC summer employee; and in 1982, by a PRPC Environmental Planner. Additional staff for the program include the commercial cleaning firm, and City-County Health Department water quality monitoring staff.

Finances

The costs of the program for 1979, 1980 and 1982 are summarized in Exhibit B. The program covers all costs except repairs and replacements of septic systems. First year costs have been estimated at $227/household with second year costs at $184/household and an average of $206/household/year or $17.16/household/month. Costs in 1982 averaged $80/household/year (based on 82 participants). It is assumed that a large-scale project would include an economy of scale reduction of 30%. With average pumping at 2.5 years/tank an estimated cost per household on a large scale would be $4.29 as calculated by PRPC in 1981. PRPC's updated estimate for an established septic tank maintenance program without groundwater monitoring is $69/household/year or $5.75/month.

Difficulties Encountered

This program initially encountered a number of problems. In the field, locating septic tanks, excavating tanks, locating access hatch location and measuring waste levels all created some difficulty. Additionally, contacting the homeowners and scheduling inspections was a problem. In response to this problem PRPC escalated their homeowner information/education program. By 1982, the one staff member doing inspections was able to provide service and make phone calls at different times of the day and accomodate the homeowners more easily.

The information in this case study was completed in June of 1982 and updated in April of 1983.

Exhibit A

BACKGROUND SURVEY RESULTS

Section III: Accomplishments and Findings*

A questionnaire filled out by the homeowners in the program yielded the following statistics as of 1979:

Number of households - 91
Mean household size - 3.6 persons
Mean number bathrooms/household - 1.7
Mean number toilets/household - 1.7
Mean tank age - 9.7 years
Predominant tank volume - 1,000 gallons
Mean ground water table depth - 34 feet
Total number of wells - 43 for 48% of homeowners with wells
Dishwasher - 61 for 66%
Garbage disposal - 63 for 69%
Clothes washer - 80 for 88%

System Failure

Type of Failure	Number	Percent of Total
Leach field	16	18%
Baffle deterioration	17	19%
Backed up sewage	9	10%

Age Distribution of Tanks

Age	Percent of Total
Less than 2 years	8%
2-5 years	31%
6-10 years	25%
10-15 years	22%
16-20 years	5%
More than 20 years	6%
Unknown	2%

Occupant Distribution per Household

Persons/Household	Percent of Total
1	4%
2	23%
3	15%
4	34%
5	11%
6	7%
More than 6	5%

*Source: Pueblo Area Council of Governments, Pueblo County Septic Tank Maintenance Demonstration Project, Progress Report - 1979 & 1980, prepared by Pueblo Regional Planning Commission, February 1981.

Exhibit B

ACTUAL PROGRAM COSTS

	1979	1980	1982
Personnel	$14,817.67	$10,250.00	$4,384.34
Supplies and Travel	$1,380.00	$2,750.00	$272.06
Contracted Work			
Cleaning	$2,291.85	$2,179.40	$920.00*
Technical Consultant	1,026.00	--	--
Ground water Analysis	1,155.00	1,617.00	856.31
Other Costs (equipment, repair)	--	--	133.45
Total	$20,670.52	$16,796.40	$6,566.16

*Includes pumping outside of contract.

Information collected from Pueblo Area Council of Governments, Pueblo County Septic Tank Maintenance Demonstration Project, Progress Reports 1979 and 1980, dated February 1981 and 1982 dated October 1982. Prepared by the Pueblo Regional Planning Commission.

Williston, Vermont

COMMUNITY STATISTICS

Name:	Williston, Vermont
Location:	10 miles southeast of Burlington
Population:	1980 - 3,843 (census) 1990 - 5,000 (projection)
Technology:	Septic Tanks
Contacts:	Kenneth W. Pinkham, P.E. Engineers Inc. of Vermont Route 2 Williston, Vermont 05495 Jerry O'Keefe Town Hall Williston, Vermont 05495
Status:	Program operating since 1978.

WATER QUALITY BACKGROUND

The Problem

In Vermont, the state health ordinance covering septic tank design and operation for residences only applies to systems on property that is both under 10 acres and is being sold. Towns can enact further regulations, in fact the state has prepared a suggested local regulation, but few communities have chosen to adopt it. In 1977, Williston did not have an effective local ordinance governing septic tanks. At that time, septic system failures were occurring throughout the town, with some systems failing within two years of installation. The Vermont Department of Health investigated the situation and was dissatisfied with the lack of local regulation enforcement. In July of 1977, the state caused to be imposed a building moratorium on the town because of the wastewater problems. Passage of a local wastewater disposal ordinance acceptable to the state was the requirement for lifting the moratorium.

The Solution

Williston is run by a volunteer Board of Selectmen. The town does not have any full time administration. To solve the wastewater problem, and lift the building moratorium, the Selectmen felt they had two options: hire a full time person to develop and administer a wastewater program; or contract out the work. Not wanting to add to the town payroll, the Selectmen chose to work with Engineers, Inc., a local consulting firm. The firm helped design the ordinance and also administers the program.

WASTEWATER MANAGEMENT

Current Practices

Engineers, Inc. worked with the Board of Selectmen in drafting a wastewater disposal ordinance. The new local ordinance supplemented and modified the regulations recommended by the state. The Williston ordinance requires a three part review:

1. Site and soil evaluation done by a registered professional engineer and confirmed by a representative of Engineers, Inc.

2. Design of on-site system reviewed by Engineers, Inc. against specific criteria in the local ordinance. Designs are approved or disapproved by the Acting Town's Consulting Engineer acting as the Health Officer's agent.

3. During construction, prior to backfilling, an Engineers, Inc. representative inspects the installation. If the system is acceptable, the property owner receives a certificate of occupancy.

This process applies to all new systems and to any work done to existing systems that are malfunctioning.

Legal Responsibilities

Williston Board of Health--enforcement of the Williston wastewater ordinance.

Vermont Agency of Environmental Conservation, Division of Protection--enforcement of state on-site wastewater regulations which apply to certain residential, commercial and industrial systems in the town of Williston and elsewhere.

Management Responsibilities

Williston Board of Health--reviews the sites and designs rejected by Engineers, Inc. and hears appeals by property owners. The Board has the authority to issue waivers to the ordinance requirements.

Homeowner--responsible for system maintenance.

Staffing

The consultant, Engineers, Inc., provides all the technical staff for the site, soils and design reviews. The Williston Board of Health only hears appeals for waivers. The Board is not involved, nor are any other town employees involved in the routine review process.

Financing

All applicants for occupancy permits pay a $150 fee which covers the one site, one design and one construction review done by the consultant. The local ordinance allows the consultant to collect overage (i.e., if more than one visit is required for site or construction review) directly from the applicant.

The information in this case study was compiled in June of 1982.

Lagoona Park, Indiana

COMMUNITY STATUS

Name: Lagoona Park, Indiana

Location: A subdivision on Lake James in Steuben County, 6 miles northwest of Angola, Indiana. Located in extreme northwestern Indiana

Population: 14 year-round homes with a present population of 40

Technology: STEP (septic tank effluent pressure) system to cluster the homes to a soil absorption system

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Status: Construction of the cluster system (Pilot Project) was completed in January of 1983. The Steuben Lakes Regional Waste District (SLRWD) is currently setting up a management plan for the 14 homes on the cluster system. A Step I Facilities Plan for 28 to 30 cluster systems for 1,000 homes in the lake area is presently being reviewed by EPA.

WATER QUALITY BACKGROUND

The Problem

Thirteen homes in Lagoona Park have some type of septic connection to the lake channel. Most homes presently have 300 gallon septic tanks that gravity drain into a dry well which overflows to the lake channel. The water table is 12 inches below the surface year-round. Only one home has a properly sized and operating septic system.

The Solution

Purdue University and Rowland Associates (engineering firm in Angola contracted by SLRWD), designed a STEP cluster system with a pressure-dosed soil absorption system. The soil absorption system is located 900 feet away from the entrance to Lagoona Park on a golf course fairway. Access risers are located on all septic tanks, lift stations, and dosing chambers. This system is a pilot project. Since it has been successful, this cluster system design is being proposed for 1,000 additional homes within the waste district. The cluster systems will overcome the waste disposal problems associated with the site characteristics of lake communities, which include poor soil conditions, high water tables, small lots, inadequately sized septic systems, and year-round homes.

Additionally, all homes in the pilot project are fitted with water conserving devices. These devices include toilets, showerheads, and clothes washers. The purchase and the installation of these water conserving devices were financed through an EPA project at Purdue to study the effects of water conservation on on-site septic systems.

WASTEWATER MANAGEMENT

Current Practices

The sanitarians from the Steuben County Health Department issue septic permits and inspect on-site systems during construction. The health department also follows up complaints filed by county residents and offers assistance to try to determine a solution if an on-site problem is found. The SLRWD at this time has very few management responsiblities for the area, but is presently drafting a management program for the pilot project. The original purpose of the SLRWD was to act as an intermediary between the local constituents and state and federal governmental agencies.

Legal Responsibilities

The Indiana State Board of Health issues standards to which all newly constructed and repairs to existing septic systems must comply.

The Steuben County Health Department enforces the state codes and standards in the construction, repair, and operation of on-site septic systems. The health department issues the permits necessary for septic system construction and repair. They also inspect construction of installations.

PROPOSED MANAGEMENT PLAN

Legal Responsibilities

The SLRWD has the power to assess fees, obtain property easements, and manage on-site systems, both clusters and individual systems. The SLRWD does not have the power to condemn property. This organization also acts as an intermediary to apply for any available funding. They also establish district boundaries, select and regulate systems, and contract out needed work.

Mangement Responsibilities

An EPA - Innovative and Alternative - grant paid for 85 percent of the construction costs of the pilot project STEP system. The State of Indiana, through the Indiana State Board of Health, paid for 6 percent of the project. The local share, 9 percent, was paid by the SLRWD through the assessments of fees to the homeowners of Lagoona Park.

Easement rights are obtained through the SLRWD. The property easements for the locations of the lift station and the absorption fields have been obtained from the respective property owners by allowing those property owners access rights to the STEP system in the future when present systems fail. Predetermined maximum flow rates have been established for these properties and the system designed accordingly. The SLRWD will be the managing body for this cluster system. This includes all operation and maintenance of the STEP system and soil absorption systems. The homeowner will be responsible for the interior plumbing and those sewer lines between the dwelling and septic tanks. The homeowner is also responsible for the operation and maintenance of the pump located in the septic tank on the respective properties.

At Lagoona Park, the groundwater sampling testing, and monitoring will be performed by Purdue University. After successful evaluation of the system, the monitoring function will be turned over to the SLRWD to contract out to the proper authorities.

The operation and maintenance of this and all future systems will be contracted out by the SLRWD to the proper contractors to perform the necessary functions. These functions will include maintenance of pumps, and inspection and cleaning of septic tanks. These functions will be performed on a regular basis: septic tanks inspected once per year and cleaned every three years or as needed. Pump servicing and other maintenance will be performed as needed.

The SLRWD will be responsible for all future systems to be constructed within their boundaries. Permitting and design approval will follow the present procedure which involves the local and state boards of health.

Staffing

The SLRWD will staff a secretary/ accounting clerk to maintain records of billings and maintenance to homeowners and contractors. Because the SLRWD is a volunteer organization, all other work will be contracted out. The local health department will annually inspect such systems for proper operation.

This case study was prepared by Mark Hampton of Purdue University in June of 1982. It was updated by USR&E staff in May of 1983.